Textile World Journal

V 53 38

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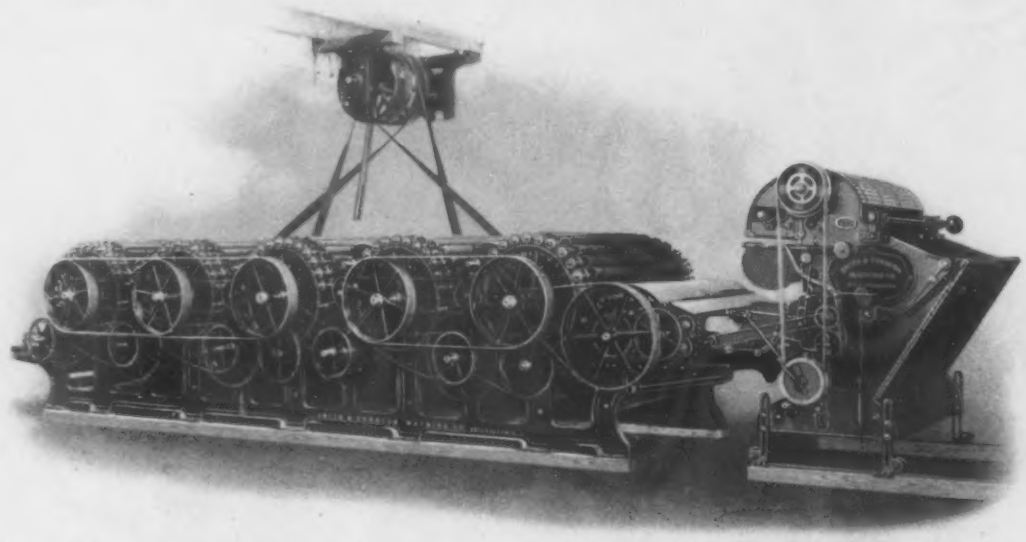
When You Think of Machinery for

Shoddy

"Smith & Furbush"

Should Come at Once into Your Mind



The Headquarters for

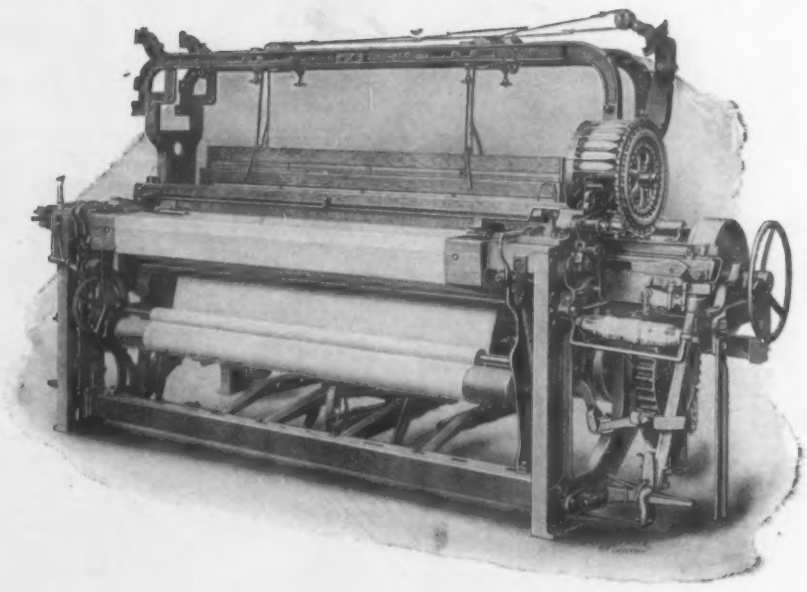
GARNETTS, CARDS, PICKERS, SHREDDERS, DUSTERS
for all kinds of Shoddy stock is

Smith & Furbush Machine Co.

PHILADELPHIA

Ask for circular J85 *Garnetts;* J152 *Shoddy Cards;* J1 *Pickers;* J145 *Shredders;* J8 *Dusters; or any others of interest to you.*

Also Builders of Machinery for Batts, Felts, etc., of Cotton, Cotton Waste, Jute, Wool—Spinning Coarse Yarns on the Wool Principle from Cotton Waste—Making Rewoven Gunny Bagging from Scraps—Asbestos Machinery — Carding Machinery for All Kinds of Stock.



NORTHROP

TRADE-MARK REGISTERED

WORSTED LOOMS

SAVE 50 TO 75 PER CENT

OF THE LABOR COSTS

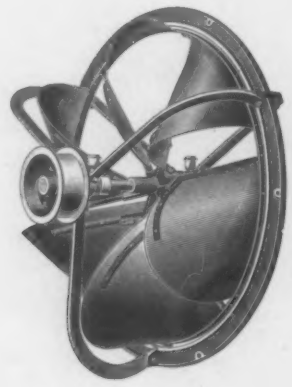
OF WEAVING

DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

Southern Office
188 South Forsyth Street Atlanta Georgia

Copyright 1916 by Draper Company



THE BERRY WHEEL

or Fan is Unrivaled
for Moving Air

For ventilating, cooling, and heating; removing steam, acid fumes, dirt, dust and smoke or anything that floats in the air.

For drying cloth, yarn, hosiery, rags, cotton or wool stock or any material where an efficient fan is needed.

Used by hundreds of Textile Mills
Tested for thirty years

MANUFACTURED BY

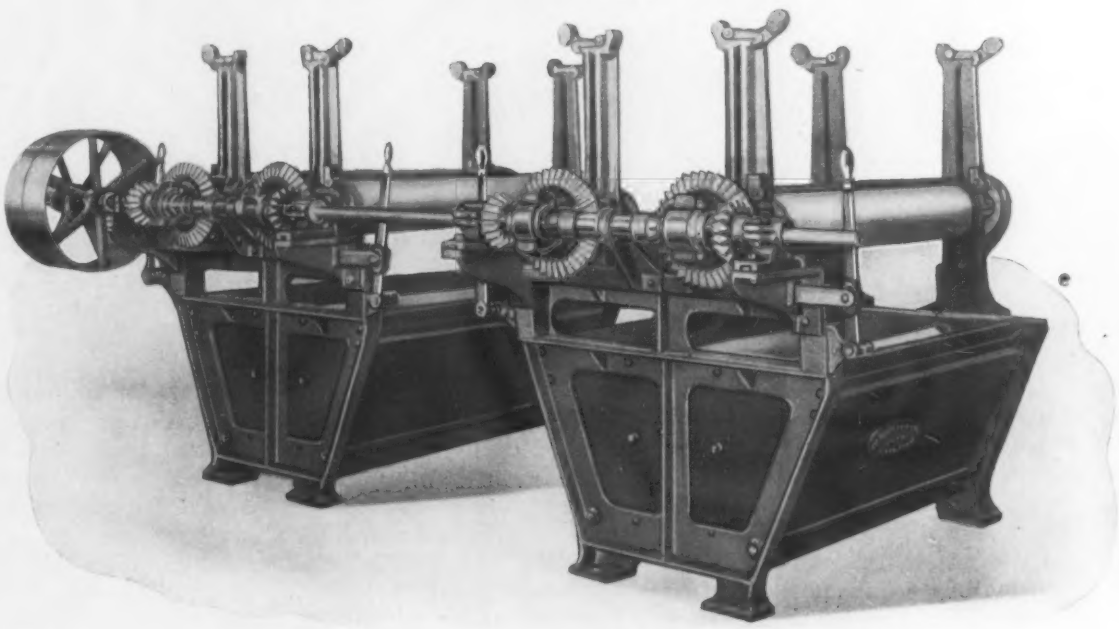
THE A. HUN BERRY FAN CO.
29-33 West First Street Boston, Mass.

THE TEXTILE-FINISHING MACHINERY CO.

MAIN OFFICE and WORKS

PROVIDENCE, R. I.

KHAKI MACHINERY



DYE JIGGS

DRYING MACHINES

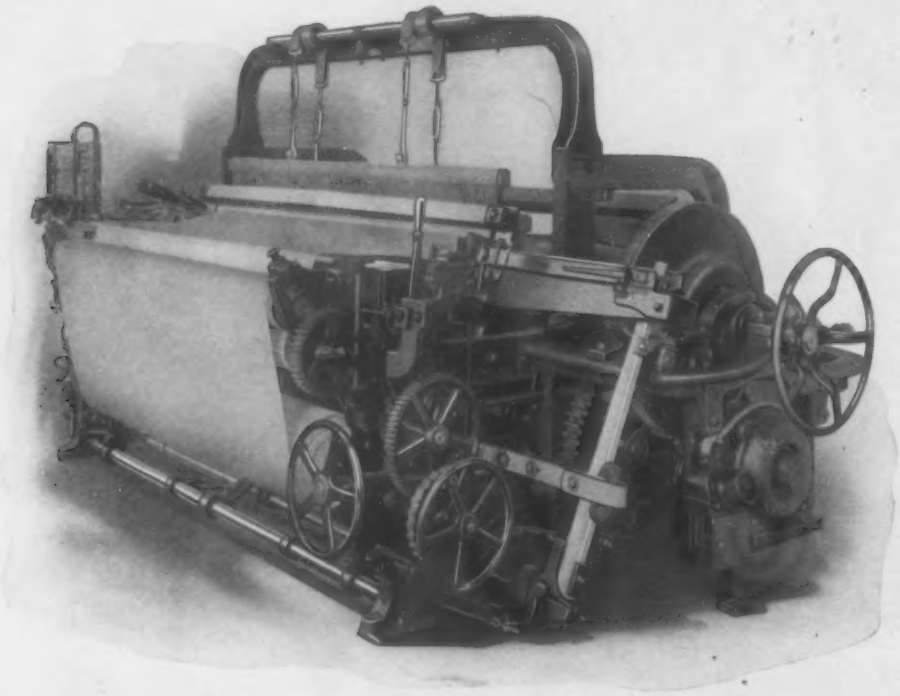
PADDERS AGERS

BOX DYERS HOT FLUES

COMPLETE PLANTS

N. Y. OFFICE, 30 CHURCH STREET

Automatic Shuttle Changing Duck Loom



In the Automatic Shuttle Changing Duck Loom, Crompton & Knowles Loom Works offers to the textile industry a loom which gives much desired economies, and produces better cloth.

This loom is equipped with a magazine in which are placed shuttles with filled bobbins. On the end of the loom opposite the magazine is a feeler which is in contact with the yarn on the bobbin each time the shuttle enters the box. When the filling is nearly exhausted, the feeler operates, causing the mechanism to eject the shuttle into a receiver at the back of the lay end, from whence it slides into a receptacle at the feet of the weaver. At the time this shuttle is ejected another shuttle with a filled bobbin takes its place. This action all occurs while the loom is running and without losing a pick. This valuable feature not only increases production by the continuous running of the loom, but better cloth is also made. The beat of the lay being constant, the chance of thick or thin places occurring in the goods is practically overcome.

The shuttle changer is also applied to Tire Fabric Looms where it is giving excellent service. Hundreds of looms are running with the Crompton & Knowles Shuttle Changer. An inspection of this feature will convince the textile manufacturer of its practicability and merit.

The Automatic Shuttle Changer on duck looms

Increases Production.
Decreases Cost.
Improves Quality.

We shall be glad to furnish complete information regarding this feature and demonstrate its operation.

Crompton & Knowles Loom Works

WORCESTER, MASS.

PROVIDENCE, R. I. **PHILADELPHIA, PA.**

Paterson, N. J. Office: Citizens Trust Building

ALEXANDER & GARSED, Southern Representatives, Charlotte, N. C.

Cooley & Marvin Co.

Management Engineers

The installation and development of Scientific Management in manufacturing plants.

We suggest that as your first step, when considering perfecting your plant and operating methods, you authorize us to make a Preliminary Survey of your individual conditions and report to you the methods by which we may find it possible to reduce your costs and increase your output. This Preliminary Survey and Report will be made by technical graduate engineers, with years of practical manufacturing experience, and every recommendation made will be based upon previous actual experience and successful use of the principles of Scientific Management, and with the certainty that it can be advantageously carried out in your plant. We make no experiments. The individual sections of the work and the development of the whole are carefully planned in advance and carried out with rapidity and precision. No work will be suggested or undertaken except as is commensurate with and demanded by the needs and possibilities of your business, and every move made must be such that the outcome can be readily foreseen.

For instance, our junior engineers will, if necessary, actually operate machines or perform the manual operations to demonstrate the accuracy of tasks set as a result of their time studies. No "speeding up" of labor is advised. Our methods result in better earnings for you, better pay for employees, and a spirit of satisfaction in the plant which greatly increases the average length of your employees' service.

Cost Accountants

Our experience in the successful preparation, installation and supervision of cost systems in hundreds of manufacturing plants, including uniform association methods of cost finding and cost control, is your guarantee of sound practice. On engineering points our engineers are always available for consultation.

Auditors

This department is wholly distinct and separate from the others. It is conducted by a number of Certified Public Accountants with special experience in different lines, and covers the customary periodical audits, special examinations for financial and other purposes, taxation accounting and methods of financial and commercial accounting.

Chicago, Illinois
1410 Conway Building

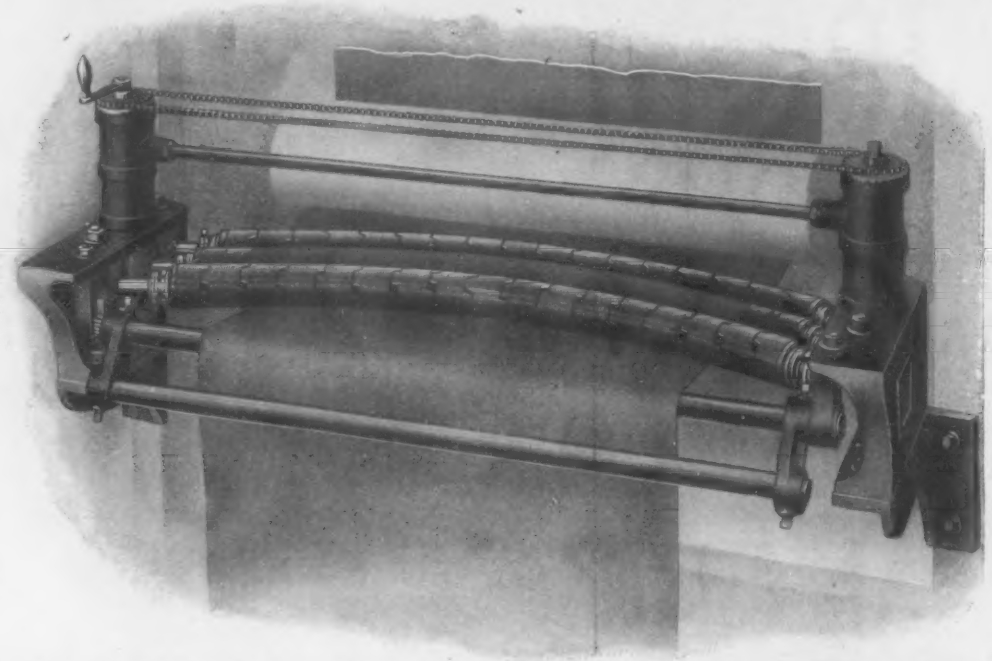
Boston, Massachusetts
708-712 Tremont Building

THOMAS LEYLAND & CO.

F. T. WALSH, Manager
Office and Works: Readville, Mass.

Sole Manufacturers of THE WILLIAM MYCOCK

Improved Regulating Cloth Expander

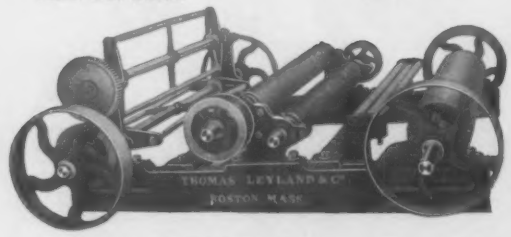


Expander Attached to Calender showing Regulating Motion and Adjustable Tension Bars

This Expander and its improved features are fully protected by basic United States patents, and by others still pending, under which the builders will maintain their patent rights against any who may violate such rights by building, selling or using machines of this character.

WHALE BACK SEWING MACHINE

EXPANDER WITH PATENTED CENTRE SUPPORT FOR HEAVIER WORK



SCUTCHER

PORTABLE PIECE ENDSEWING MACHINE

THOMAS LEYLAND & CO.

F. T. WALSH, Manager

Office and Works: Readville, Mass.

Manufacturers, Importers, Dealers

Gums, Dextrines, Soluble Starches, Finishing Gums, Tapioca Flours, Soluble Oils, Turkey Red Oils, Acetate of Chrome, Softeners, Sizes

For

COTTON MANUFACTURERS
WOOLEN MANUFACTURERS
WORSTED MANUFACTURERS
CALICO PRINTERS
BLEACHERS AND FINISHERS
ENVELOPE AND PASTE MANUFACTURERS
KHAKI MANUFACTURERS

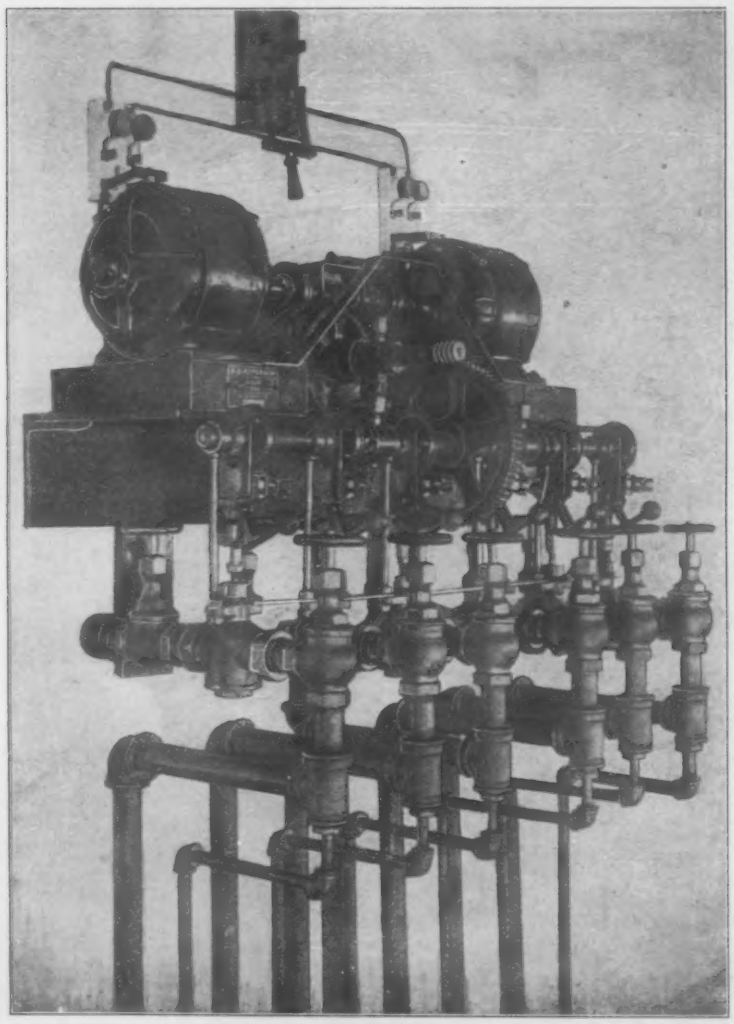
Also

Lappings, Blankets, Doctors, Files,
Doctor Stones, Finger Stones, Gravers,
Polishing Stones, for Calico Printers

Jefferson Control of Circulation by Positive Action Time-Valve as Applied to Boiling Kiers

This control is simple, foolproof and positive in control, is easily understood and calls for no further attention after it has once been set.

It is operated by any kind of power—the six bank valve controller requires only ½ H. P.—one kier or any number of kiers may be operated by the same driving shaft, and it can be located anywhere, either near to or far from the kier room.



Six-Bank Motor-Driven Time Valve Controller, in Operation at the Revolution Cotton Mills, Greensboro, N. C.

The Jefferson Automatic Circulating Kier Eliminates Channelling, Staining or Tendering

You cannot tell one part of the batch from another

Saves 35 to 80% in time of Boiling

Saves 38 to 85% in Coal, Alkali and Chemie

These Savings Pay Dividends

☞NOTE THE SIMPLICITY OF INSTALLMENT

IF INTERESTED
write for booklet giving further information with actual tests made under ordinary working conditions

E. D. JEFFERSON
53 State Street, BOSTON, MASS.

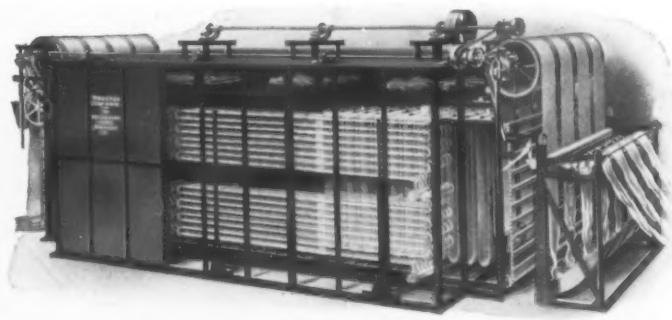
"Proctor" DRYERS

"PROCTOR" Dryers represent the absolutely-latest practice in every detail. They embody all those qualities conducive to their structural strength and are well equipped with every labor-economizing appliance.

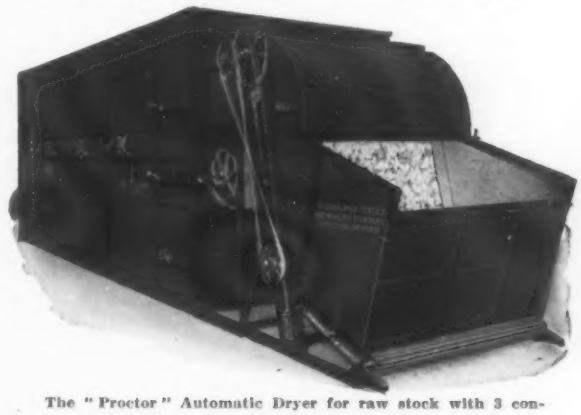
Write for catalog, stating materials to be dried

The Philadelphia Textile Machinery Co.
PHILADELPHIA

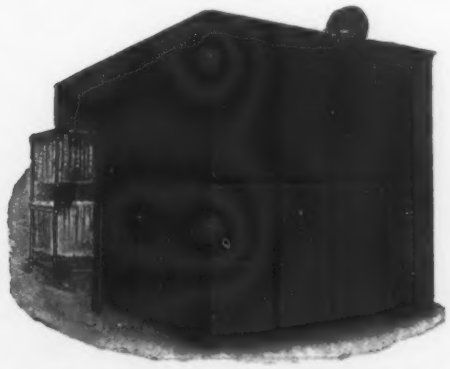
PROVIDENCE, R. I. Howard Building **CHICAGO, ILL.** Lytton Building **CHARLOTTE, N. C.** H. G. Mayer—Realty Bldg.
Hamilton, Ont., Can., W. J. Westaway, Sun Life Bldg.



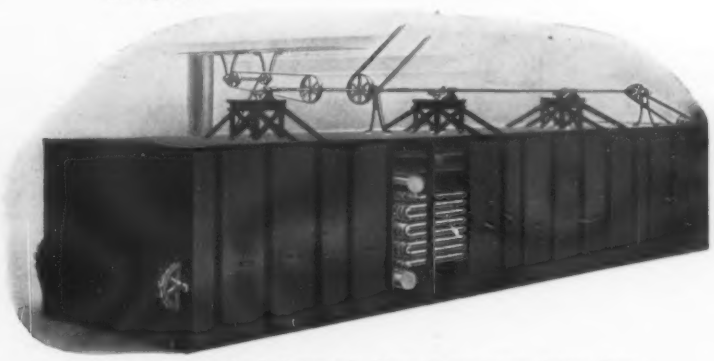
This "Proctor" Automatic Looping, Drying and Folding machine dries knit goods in the string, toweling, etc., perfectly flat and leaves the goods dried. No harshness. No baking.



The "Proctor" Automatic Dryer for raw stock with 3 conveyors (one above the other) dries as much as a single conveyor machine nearly three times as long, and requires no more power.



The "Proctor" Truck Yarn Dryer requires minimum power and steam, and delivers the yarn properly dried.



The "Proctor" Automatic Yarn Dryer saves labor, floor space and steam.

(18-1)

Humidify Your Mill by the Carrier System

The Carrier System of humidifying textile mills possesses the following distinct advantages:

Our system cools the spinning room to two degrees of or below the outside temperature in summer, insures uniform heating and temperature regulation in winter, and in both summer and winter maintains and controls different humidities in different parts of the mill.

The entire humidifying, cooling and heating plant is centrally located at one point. Each department can be controlled at the apparatus or at each separate room as desired. If necessary, can be arranged to provide for local conditions.

Working operations of the apparatus are very simple, in plain sight and involve no complicated parts to get out of order. The sprays are readily accessible and the spray water may safely be recirculated without other filtration than provided by the apparatus. Only a small part of the time of one man is required to care for the entire humidifying, cooling and heating equipment.

Humidifies and cools the air before, not after, entering the room.

Gives a very uniform humidity throughout, due to the absence of a direct spray in the room. The air is saturated and all excess moisture removed so that every cubic foot of air going into the mill carries exactly the same amount of water vapor.

Procures saturation of the air introduced into the mill in summer without the use of steam, effecting a saving and giving the greatest cooling effect.

The regain is kept practically constant, thereby assuring a very uniform product.

With the desired humidity being maintained, the rooms are cooled to a lower temperature than could be done with other systems, even with all windows opened.

No dependence on uncertain and insufficient air leakage in and out of the mills for cooling effect.

Humidified and cooled air delivered to work rooms under slight pressure and so as to avoid drafts. Inward leakage of hot air in summer and of cold, dry air in winter are thereby prevented, an essential feature for uniform humidity and temperature conditions.

Cools the rooms without opening windows in summer, thereby avoiding window drafts—disastrous to fine yarns.

Humidity automatically controlled at any desired per cent, and by very simple and accurate mechanism.

All entering air is thoroughly washed and all dirt, soot and dust are removed. Opening of windows is never necessary or desirable, except when necessary to allow heated air to escape from the building, so the product is kept cleaner.

Permits a large portion of the air to be recirculated when heating in winter, thereby effecting great economy. At the same time, such recirculated air is thoroughly freed from all impurities such as "fly," dust or other organic matter injurious to health.

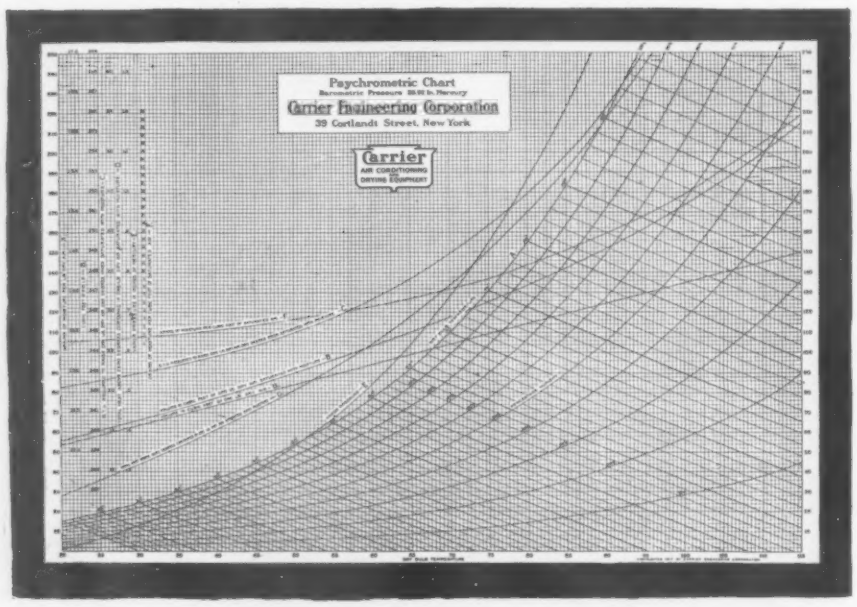
Thorough ventilation. The copious supply of clean, pure, fresh air enables the employees to do more and better work, by reason of enjoying better health. Better working conditions attract a bette grade of help.

No steam or water piping strung along the ceiling. Piping here is not only very inefficient in heating, but catches dust and lint, which eventually drop off and cause inequalities in the yarn and increase the quantity of seconds.

Removes fully two-thirds of all the "fly" and dust ordinarily associated with card and spinning rooms, thus greatly improving the working conditions for the operatives, and at the same time improving the quality and uniformity of the yarn.

A Carrier-equipped mill is always distinguished by the noticeable absence of odors, dust and oppressive atmosphere so usual in many mills.

Water vapor only introduced into the mill. All water in liquid form retained in apparatus where there is no chance of leakage onto product.



The Carrier Psychrometric Chart, FREE to Consulting and Managing Textile Mill Engineers

The Carrier Psychrometric Chart enables the user to determine:

1. The volume in cubic feet of a given weight of dry air at various temperatures.
2. The volume in cubic feet of one pound of dry air saturated with moisture at various temperatures.
3. The total heat of air above zero when saturated with moisture.
4. Grains of moisture per cubic foot in saturated air.
5. The vapor pressure of saturation.
6. The grains of moisture mixed with one pound of dry air when saturated.
7. The wet bulb temperatures corresponding to various relative humidities and temperatures.

In other words, the chart is particularly valuable for calculating.

1. The amount of heat required to raise the temperature of a given volume of air when saturated or partially saturated with water vapor.
2. The wet bulb temperatures corresponding to the various combinations of temperature and relative humidities.
3. The changes in temperatures, humidities, and wet bulb temperatures caused by the addition or subtraction of moisture.

This chart can be used in calculating almost any problem where temperature and the humidity of the atmosphere are concerned.

We have had this Carrier Psychrometric Chart lithographed on metal with neat frame (size 19 by 13 inches), suitable for hanging up in the office or plant.

If you can use a copy and will so advise us **promptly**, we will send you one postpaid. As the edition is limited, we should receive your request at once.

Write for our book

"The Carrier System as Applied to Textile Mills"

Carrier Engineering Corporation

Carrier AIR CONDITIONING DRYING EQUIPMENT

39 Cortlandt St.
New York

Carrier AIR CONDITIONING DRYING EQUIPMENT

BOSTON
176 Federal St.

PHILADELPHIA
Land Title Bldg.

BUFFALO
Mutual Life Bldg.

CHICAGO, Transportation Bldg.

POLYZIME

Trade Mark

USE

Polyzime

For De-gumming and De-sizing

Polyzime is a new powerful enzymic product of *Japanese* origin and of a purely vegetable nature, originated and manufactured by the Takamine Laboratory, Inc.

As its name implies, **Polyzime** possesses many enzymic activities; it is strongly diastatic, as it solubilizes, dextrinizes, as well as saccharifies starches.

It is proteoclastic, as it digests or reduces various protein matters such as gluten, sericin in silk, pectin, milk, etc.

Hence **Polyzime** is indispensable in modern textile mills of today for de-gumming and de-sizing purposes.

The best material for **KHAKI** work

Some of the many advantages of this excellent material are as follows:

1—Remarkable starch solubilizing power.
2—Cleans goods not only of starch but also of protein gums and pectinaceous matter.
3—Increases production by cleaner and more even goods.
4—Dissolves readily in the regular batch.
5—Does not affect colors and produces softer finish.
6—While consistency is thin, efficiency is greater.

IMPORTANT

Polyzime is economical to use. Saves heat and time; therefore money. Proper temperature of bath is 120° F. Being in a thin liquid state it is very easily handled and there is positively no waste as with a heavy product. It is shipped in barrels and can be quickly drawn through a faucet.

Samples and Prices Gladly Submitted on Request

Address all correspondence, telegrams and orders to

CHAS. S. TANNER COMPANY

(ESTABLISHED 1866)

Sole Agents and Distributors of Polyzime for the Textile Trade in the United States

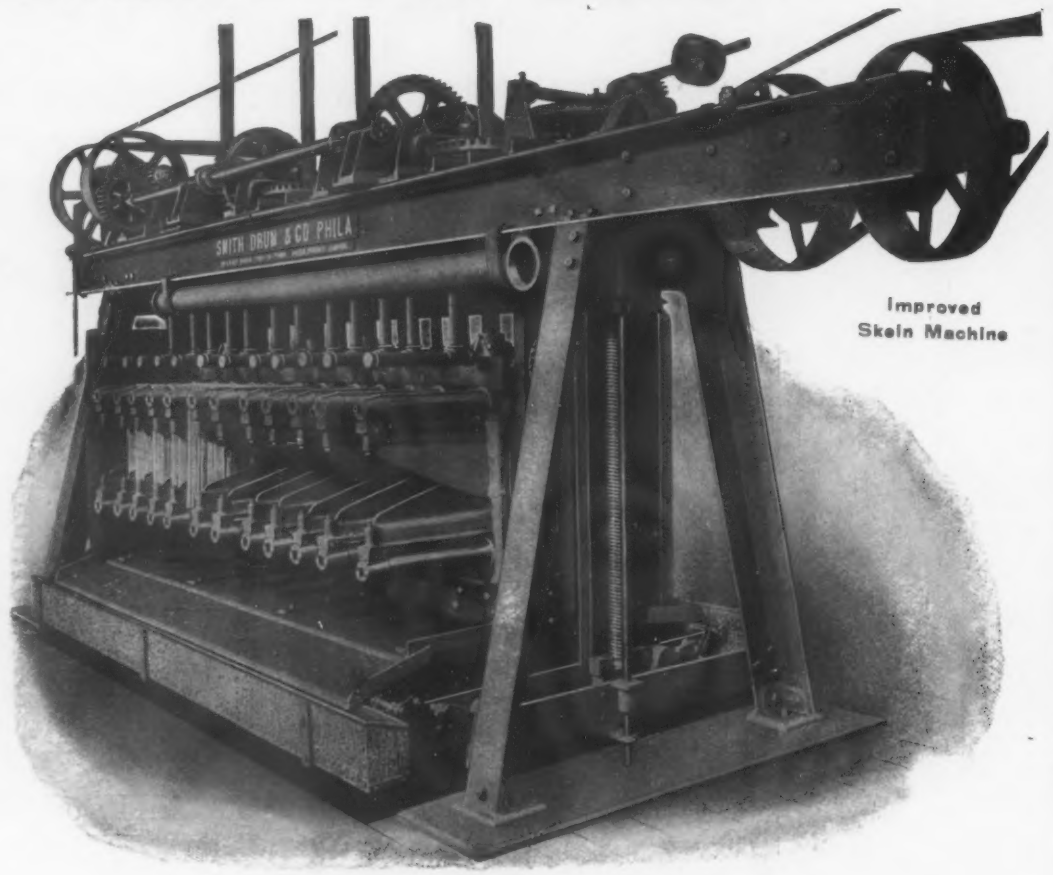
246 to 256 South Water Street

PROVIDENCE, R. I., U. S. A.

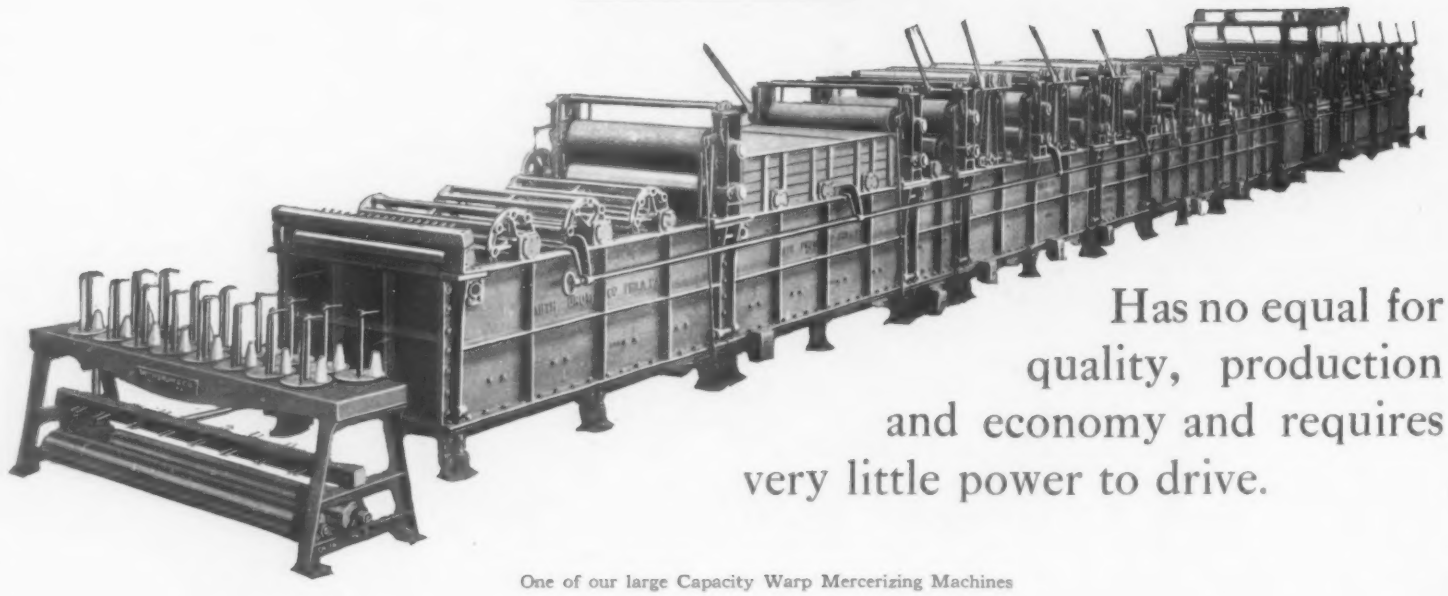
MERCERIZING MACHINES
FOR SKEINS AND WARPS

Our Improved Skein Machine has been in use for years by the best concerns.

It surpasses all others in production, quality of work, and economy of operation.



Improved Skein Machine



Has no equal for quality, production and economy and requires very little power to drive.

One of our large Capacity Warp Mercerizing Machines

Dyeing Machines of every description for Sulphur, Developed and Aniline Dyes

SMITH, DRUM & CO., Allegheny Avenue, Below Fifth Street PHILADELPHIA, PA.

"Builders of the Best"

Southern Agent, H. G. MAYER, Realty Bldg., Charlotte, N. C.

Pickers and Cards Run Smoother when Equipped with Hubbard Ball Bearing Boxes

SMOOTH running machines mean easier starting, less friction, less wear, less power and more uniform production.

These different factors result in a considerable saving in the cost of production. That is why Hubbard Boxes soon pay for their initial cost in the savings they effect.

An additional feature of these Boxes is their "oil-tight" construction. This means not only a saving in lubrication expense but also the elimination of seconds due to oil stains.

Hubbard Boxes are simple, compact and rugged. They are furnished complete—ready to be bolted to the frame in the same place as the present housing, without machining at the mill. The Ball Bearings used are the S. K. F. Self-Aligning Type.

Our Engineers will gladly investigate and give you full details about the installation of Hubbard Ball Bearing Boxes in *your* mill. Get in touch with them and ask for Catalog.

CARD BOX, MAIN SHAFT BEARING
showing S. K. F. Ball Bearing

The illustration shows the simplicity of design of Hubbard Boxes

BEATER BOX FOR PICKERS
showing S. K. F. Ball Bearing

The lubricant is held in the lower half of the casing

Over 272 Mills now have in operation Hubbard's Ball Bearing Boxes equipped with S K F Ball Bearings on their pickers and cards.

Letters from our customers' report as follows:

"Thirteen (13) pair of Beater Boxes saved 10.27 H.P. night and day. Saving in oil, clean beater box sides and cool running sufficient to recommend them to practical cotton mill men."

"Our installation of October, 1913, saved at least fifty per cent. in oil and no lost time in hot boxes."

"One pair on a finisher picker saved us .85 H.P. and allowed us to equip three of our mills."

Ask us for a list of users of this equipment

Hubbard Machine Company, Inc.

Worcester, Mass.

Southern Office: CHARLOTTE, NORTH CAROLINA

FIRTH VACUUM SPECIALTIES

FOR TEXTILE MILLS

Floor Sweeping
Card Stripping and Cleaning
General Machinery Cleaning

BY VACUUM

Write for information and prices

WILLIAM FIRTH

200 DEVONSHIRE STREET, BOSTON, MASS.

1888 1918

PRESENT DAY EFFICIENCY

has more than ever necessitated the adoption of every appliance and equipment that **will reduce the cost of manufacture, and increase the volume and quality of production.**

Experience has determined that no feature of a **Textile Equipment** shows **greater returns for the money invested** than a HUMIDIFYING SYSTEM as installed by us. We have Hundreds of Testimonials substantiating this statement, which, however, needs no other endorsement than is shown by the large number of equipments we are installing and have on order for immediate delivery.

FOR THE YEAR 1917

our orders for TEXTILE MILL EQUIPMENTS alone aggregate over 200 installations, of which 70% are repeat orders, from mills using our various Humidifying Appliances and kindred devices, many of whom have been our clients for more than a quarter of a century.

Over 1000 users of our system bear testimony to the SUPERIORITY and EFFICIENCY of our equipments.

Our Comins Sectional Humidifiers
Our Fan Type and High Duty Humidifiers
Our Ventilating Type of Humidifier
(Taking fresh air into the room from the outside)
Our Atomizer or Compressed Air System
Our Compressed Air-Cleaning System
Our Conditioning Room Equipment
Our Automatic Humidity Control
(Can be applied to systems already installed)
Our Automatic Temperature Control
Our Comins Electro Psychrometer

ARE ALL STANDARD OF MODERN TEXTILE MILL EQUIPMENT

Our long experience is at your service. We shall be pleased, at your request, to have our representative call and go further into the subject with you

AMERICAN MOISTENING COMPANY

120 FRANKLIN ST., BOSTON, MASS.

WILLIAM FIRTH, President FRANK B. COMINS, Vice-President and Treasurer

SOUTHERN OFFICE: ATLANTA, GEORGIA

FOREIGN REPRESENTATIVES

W. J. Westaway,
Hamilton, Ont., CANADA.

W. R. Grace & Co.
SOUTH AMERICA

Anderson, Meyer & Co., Ltd.
SHANGHAI, CHINA

A TRUCK THAT WILL LAST FOR YEARS

A long life in spite of its rough usage is proof of the rugged constitution possessed by the Laminar truck

NO truck can expect to receive gentle usage, so the Laminar trucks—all styles—are built to endure the severest kind of hard service. That's why they stand up continuously year after year.

How long some of the sturdier types will last we do not know, for some of the first ones purchased are still in use and apparently are good for many more days of usefulness.

The bodies of Laminar trucks are made of Vul-Cot—a higher development of vulcanized cotton fibre—a tough, long lasting material that for many purposes will outwear steel.

No matter how roughly Laminar cars are handled, they will not dent or splinter.

The car illustrated here has hard wood top rim, bottom band and two body bands; malleable corner castings; wood bottoms and self oiling iron yoke wheels. This same style may be had with hinged cover or with partition.

Write for illustrated bulletin of textile mill receptacles, which includes roving cans, doffing boxes, baskets, etc.—all made of Vul-Cot.

AMERICAN VULCANIZED FIBRE CO.

Sole proprietors and manufacturers

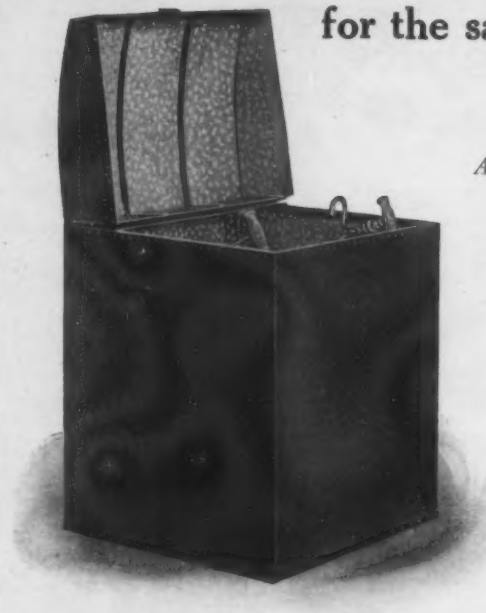
NEW ENGLAND DEPARTMENT, 12 PEARL STREET, BOSTON, MASS. *C. C. Bell, Vice-Pres., Res. Mgr.*

Head Office and Factories
WILMINGTON, DELAWARE

Smooth as a Fish Sound as a Bell

"Everything in Mill Supplies"
GALVANIZED SPECIALTIES

The Lowe Mill Oil Cabinet
for the safe and economical handling of oil



Lessens Fire Danger
In use for over thirty years
Always ready and accessible for filling cans

Equipped with the best brass pump and valves
Banded and Spot Welded by our Electric Spot Welder

Steel and Brass Thruout, no wood used
Made in two sizes

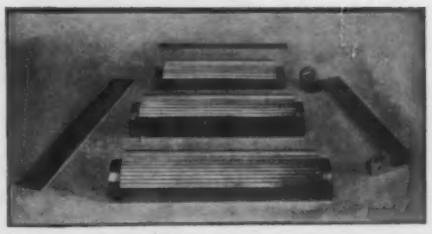
Single holds 60 gals.—Double holds 120 gals., and is made in two compartments for different oils

TAKES UP LEAST POSSIBLE ROOM

ALWAYS NEAT AND CLEAN

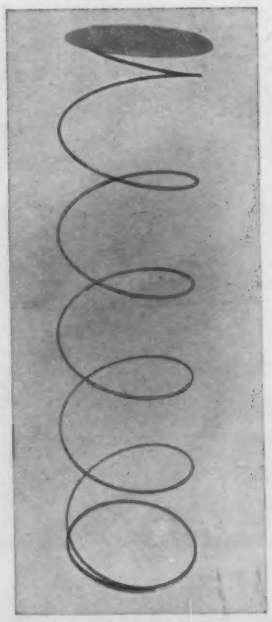
NO WASTE OR DETERIORATION OF CONTENTS

Write for prices



Reneedling of all kinds of Top Combs and Half Laps. Our experience of over thirty years is sufficient guarantee of the quality of our work.

The Easy Returning Can Spring



Saves sliver from strain

Conserve the strength of your yarns, in the sliver. The Easy Returning Can Spring does this for you, by delivering the weight from the bottom of the can to the top, into your Draw Frames, without Pull.

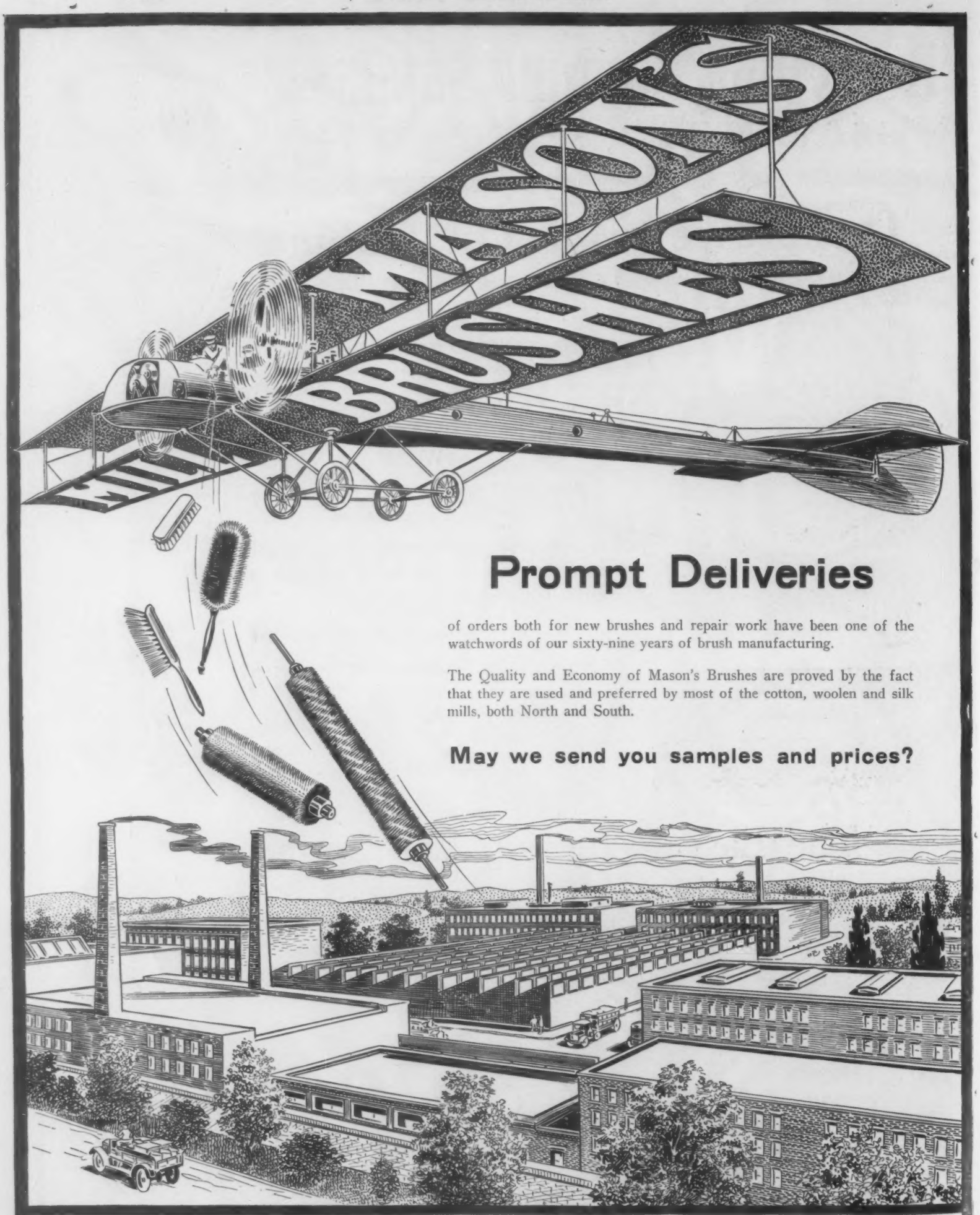
Made for all size cans

We manufacture and carry many other articles for General Mill Supply

Get our quotations

Oily Waste Boxes
Comber Waste Boxes
Hanger Drips

S. C. Lowe Supply Co.
STEPHEN C. LOWE, *President*
NEW BEDFORD, MASS.



Prompt Deliveries

of orders both for new brushes and repair work have been one of the watchwords of our sixty-nine years of brush manufacturing.

The Quality and Economy of Mason's Brushes are proved by the fact that they are used and preferred by most of the cotton, woolen and silk mills, both North and South.

May we send you samples and prices?

MASON BRUSH WORKS

Chas. A. O'Neil, Agent and Manager WORCESTER, MASS.

LEATHEROID

—The Very Best in Mill Receptacles

**Superior Materials, Superior Construction,
Superior Workmanship**

Order by the Name —"Leatheroid"

"LEATHEROID"
NO. 1 SEAMLESS ROVING CANS

Absolutely Smooth

Patented "Leatheroid" rolled top, rolled in and under two and one-half times, having no steel rim underneath the roll to break the can. Solid steel bottom, steel chime, 6 in. kicking band. We guarantee this can in every respect.

"LEATHEROID"
Steel Clad
NO. 2 WAREHOUSE CAR

"LEATHEROID"
NO. 3 WAREHOUSE CAR

The Answer

The big increased demand for Leatheroid Mill Products, coming from every section of the United States —as well as from abroad—is satisfying proof of the wisdom of our manufacturing policy—Highest Quality Goods Only.

"LEATHEROID"
COMBINATION DOFFING CAR

"LEATHEROID"
MILL BARRELS

"LEATHEROID"
FACTORY BOX NO. 3
This is a standard box for mills, strong and well constructed.

"LEATHEROID"
BOX NO. 3
With Casters

"LEATHEROID"
ROUND TAPER
BASKETS

Leatheroid Mill Receptacles are sold by Mill Supply Houses in all parts of the country. Quotation quickly secured anywhere

Write to us for our No. 8 illustrated Mill Catalog

LEATHEROID MANUFACTURING CO.

121 BEACH ST., BOSTON, MASS.

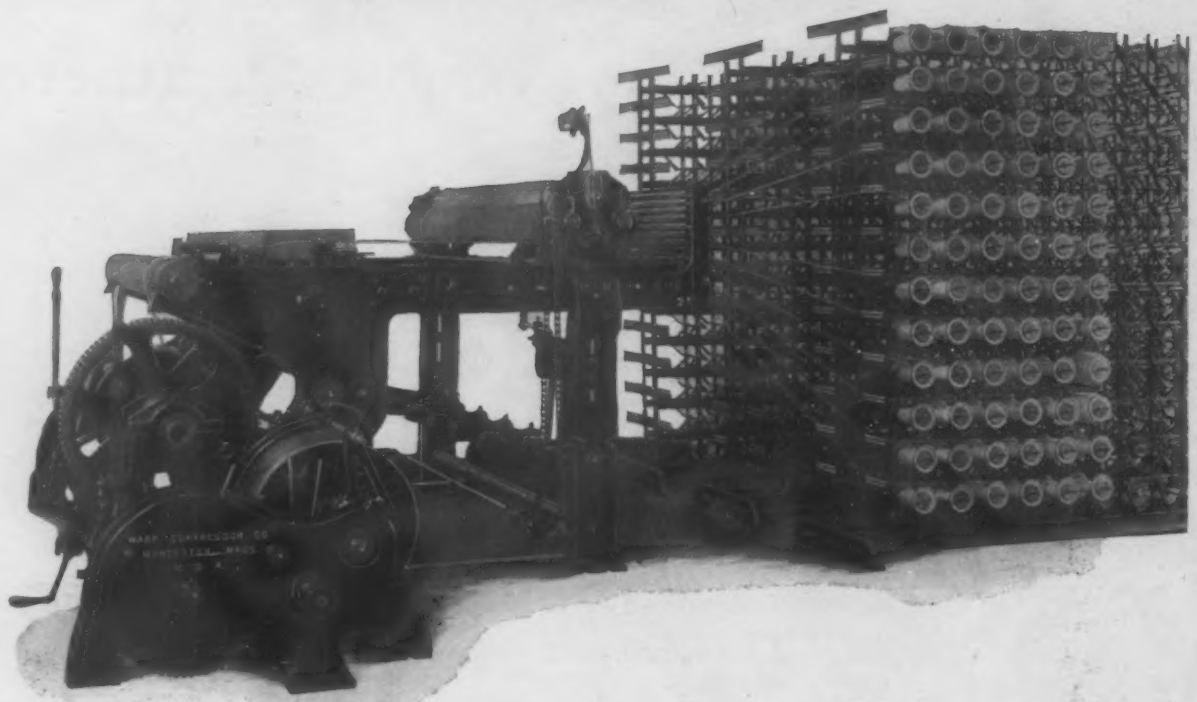
New York: 43 West 16th Street

Philadelphia: Leatheroid Sales Co., 1024 Fildart St.

Warp Compressing Machine Co.

WORCESTER, MASSACHUSETTS

DIRECT BEAMING OUTFIT



FOR PLIED YARNS

Built in Standard, Heavy and Extra-Heavy Weights. For ARMY DUCK, AUTOMOBILE TIRE FABRICS, DUCKS, SAIL-CLOTH, WOVEN BELTING, JUTE, ASBESTOS, ETC.

Beam direct from your twister-spools or cheese packages:
Cut out section beaming

30% to 50% More Yarn Per Loom Beam

UNIFORM TENSIONS

Great saving in TIME, LABOR and **WASTE.** HIGHEST EFFICIENCY TEST in your goods. PRODUCTION plus **QUALITY.**

Write for descriptive circulars and photos

Built by WARP COMPRESSING MACHINE CO., Worcester, Mass.

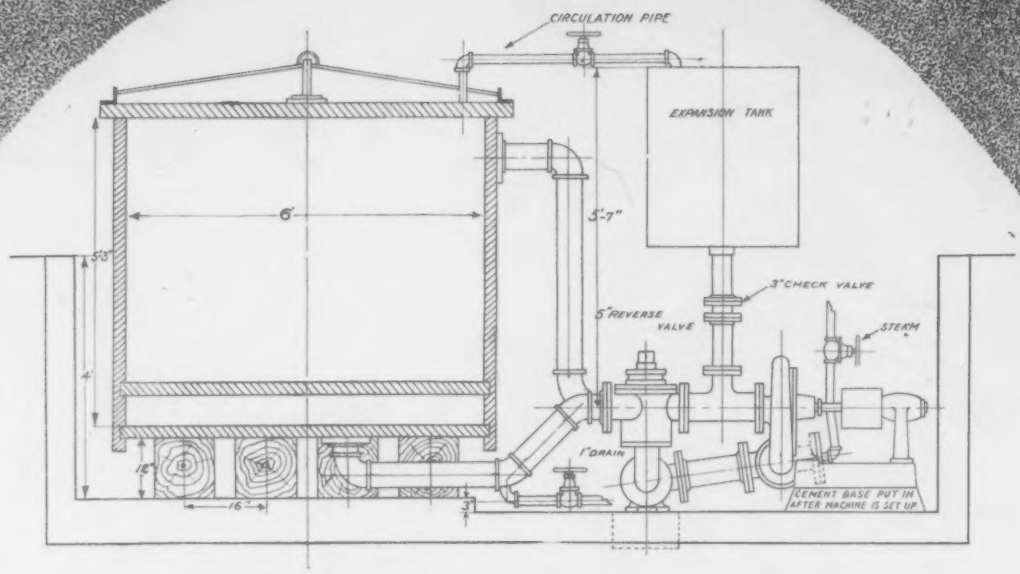
as revolutionary as the airplane

CLAUDE GRAVES

FRANKLIN

DYEING MACHINES

SEE FOLLOWING PAGES FOR DETAILS



The Franklin Top Dyeing Machine

Recently Devised to Help Win the War

Not very often do we hear of a machine paying for itself in savings in ten days' time. Yet we have good reason to believe that this Franklin Machine can accomplish that for many manufacturers now having their tops dyed in Government khaki.

This new Franklin is undoubtedly the best machine for dyeing tops yet produced. It dyes 1600 pounds of perfectly dyed tops per day, leaving them in the best possible condition. This machine has the following features, which are embodied in all Franklin Machines: simple design, durable construction and economical operation, saving in labor, steam, dyestuffs and floor space. The price is very reasonable — $1350 f.o.b. Providence, R. I.

Look over the attached list of mills already using these machines. *Your* mill should be among them. Let us send you a machine on a 30 days' free-trial basis.

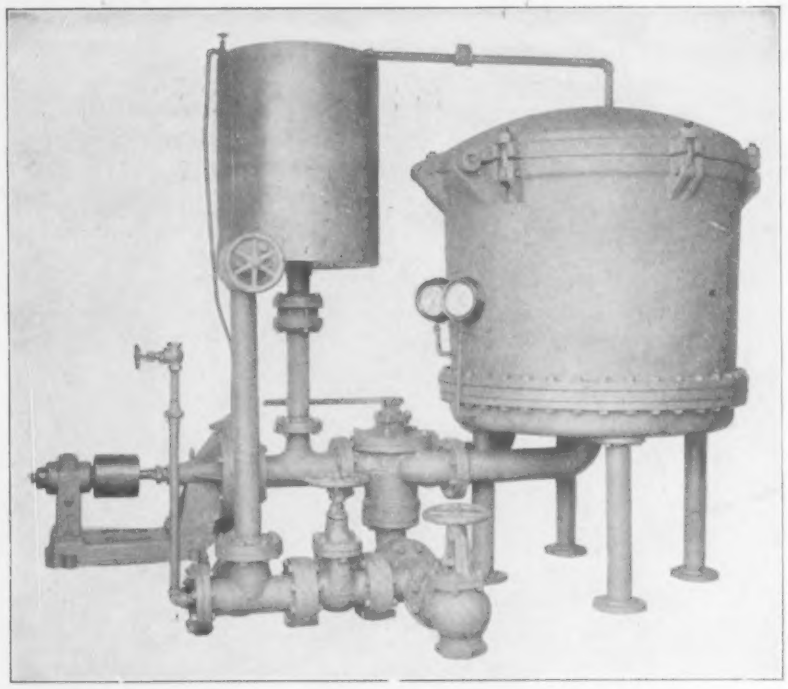
Some of the mills using the Franklin Worsted Top Dyeing Machine

WHITTALL CARPET CO.
GOODALL WORSTED CO.
N. J. WORSTED SPINNING CO.
*CAMDEN DYE WORKS
*WESTMORELAND DYE WORKS
*ENTERPRISE DYE WORKS
JOHN & JAMES DOBSON
AMOSKEAG MFG. CO.
ASHWORTH-ODELL WORSTED CO.
*STEWART DYEING & BLEACHING CO.
KENT MFG. CO.
*JOSEPH HUSSONG CO.
QUEENSBURY MILLS
BOTANY WORSTED MILLS
STILLWATER WORSTED CO.
AMERICAN WOOLEN CO.
DEDHAM CARPET MILLS
*WORCESTER BLEACH & DYE WORKS CO.

* Indicates job dyeing establishment.

Franklin Process Company

Providence, R. I.



The Franklin "Jack Spool" Dyeing Machine

Saves 3 to 6 Cents per Pound of Yarn

The rule of the hour is economical production in every department. Simpler and more economical processes are replacing former methods. Because of its convenience and economy, many mills are adopting the jack spool form of package for their yarns.

Always keeping abreast of the times, we extended our patented process to dye yarn on the jack spool. The machine delivers 1000 pounds of dyed jack spools per day. The various savings effected by this machine amount to 3 cents to 6 cents for every pound of yarn that is dyed.

The number of windings is greatly reduced, less labor is needed and the amount of floor space, dyestuffs and power cut to a fraction.

The Franklin Jack Spool Dyeing Machine has filled a want and is rapidly entering mills in all parts of the country. It might pay you to have it enter yours.

Franklin Process Company

Providence, R. I.

The Franklin "Wound Package" Dyeing Machine

The "Short-Cut Method" of Dyeing Yarn

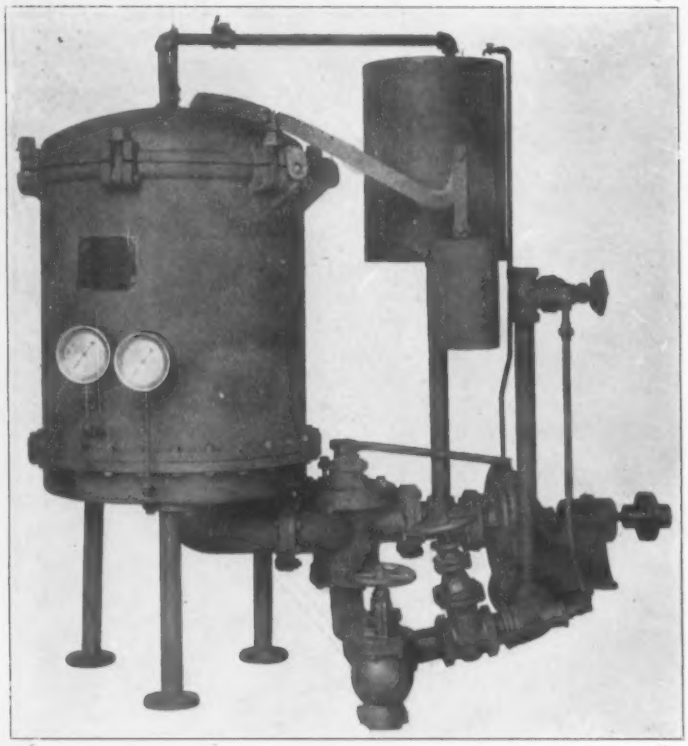
The best recommendation we can give for this machine is that in the short space of a few years, it has been installed in many mills throughout the United States and in foreign countries.

We know of no better investment tor manufacturers still using the old methods of skein and chain-warp dyeing. Contrasting briefly this new process with the older ones, the following advantages are evident: about 75% of labor saved. One man will dye, extract and dry 1000 pounds per day. At least 50% of floor space saved. Dyestuffs are saved, because of the very short dye bath and because there is no oxidation during the dyeing process. About 50% of the fuel is saved. The dyehouse becomes as sanitary and clean as the office as no steam escapes from the machine. These better working conditions result in better and more work from every individual in the dyehouse.

To give you ample opportunity for verifying the above claims, we offer to install one of these machines on 60 or 90 days' free trial. Our Booklet on this machine will prove interesting. Write for a copy.

Franklin Process Company

Providence, R. I.



The Franklin Hosiery Dyeing Machine

Dyes Hosiery in the Piece

The most serious fault of former methods of dyeing hosiery was that the appearance of the dyed material left much to be desired in smoothness, feel and finish.

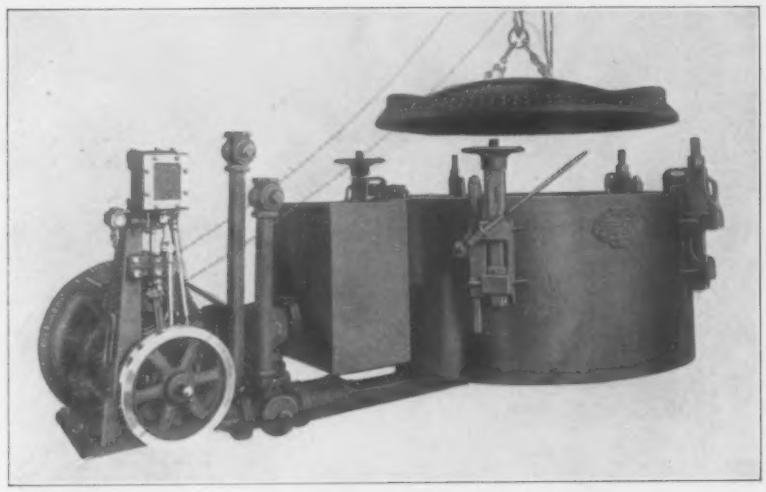
In the Franklin patented process the liquor is passed through the material, instead of the material through the liquor, as is done in the older methods. This leaves the goods in perfect condition with every particle perfectly and uniformly dyed.

This Franklin Machine possesses all the features of labor saving, dyestuffs saving, etc., of the other Franklins. It delivers batches of 100 to 500 pounds of dyed hosiery.

The names of manufacturers using these machines will be sent you on request. We will gladly arrange for a demonstration or, if desired, we will install a machine on 60 or 90 days' free trial. Don't delay—write for the details now.

Franklin Process Company

Providence, R. I.



Vacuum Raw Stock Dyeing Machine

For Loose Cotton, Wool, Shoddy, Rags, etc.

In the dyeing of raw stock it is of prime importance that the material be left in perfect condition, so that the efficiency of subsequent operations may not be interfered with. In this respect the Vacuum Machine is unsurpassed. The dyed stock is unentangled, open and lofty.

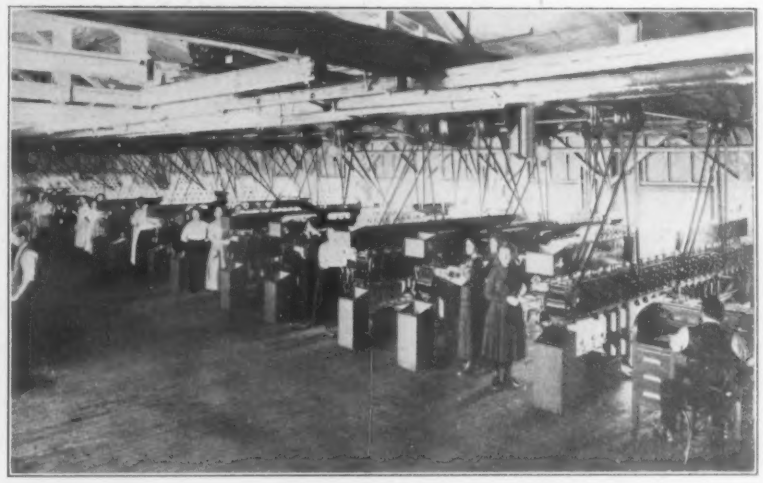
The capacity of the machine is very large for its size—1000 pounds are dyed at each charge. It is very simple to operate: when the process is completed, the entire batch is lifted out and carried to the next process by an overhead rail.

Labor is cut down and floor space reduced, while the savings in steam and dyestuff are considerable. Every machine is guaranteed mechanically for one year.

Among the mills using the Vacuum, we mention just one, the largest and best known cotton mills in the country—the Amoskeag Mfg. Co., where 33 of these machines are in use. Names of other users and descriptive Booklet sent on request.

Franklin Process Company

Providence, R. I.



Job Dyeing

Our Job Dyeing Department is equipped with every facility for dyeing any quantity of raw stock, hosiery in the piece or yarn in universal wound tubes, cones, quills or jack spools, worsted tops, etc. The quality of this work is unsurpassed. Deliveries are prompt: we process your yarn and ship it within three days to one week of its receipt.

The fact that this important branch of our establishment has grown with remarkable strides is conclusive evidence of the efficiency of the Franklin Machines, with which it is equipped. The economies effected by these machines mean that we can quote you prices that are very reasonable.

If you do not install Franklin Machines for your own use, it will be to your advantage to have us handle your dyeing.

Franklin Process Company

Providence, R. I.

Specialists in Dyeing Machinery

Our business is dyeing and the manufacture of dyeing machines, exclusively. These machines are not the result of mere theory, but are the direct products of the need for more efficient machinery in our own dye house. They are thoroughly *practical* to the last detail.

If you have a Cotton, Woolen, Yarn, Hosiery or Raw Stock Dye House, we can equip you with the most modern and efficient mechanical apparatus for dyeing.

Our Engineers, because of their specialized experience and knowledge, are capable of giving you expert advice for putting your dye house on a high plane of efficiency. Their services are at your disposal without any *obligation* on your part.

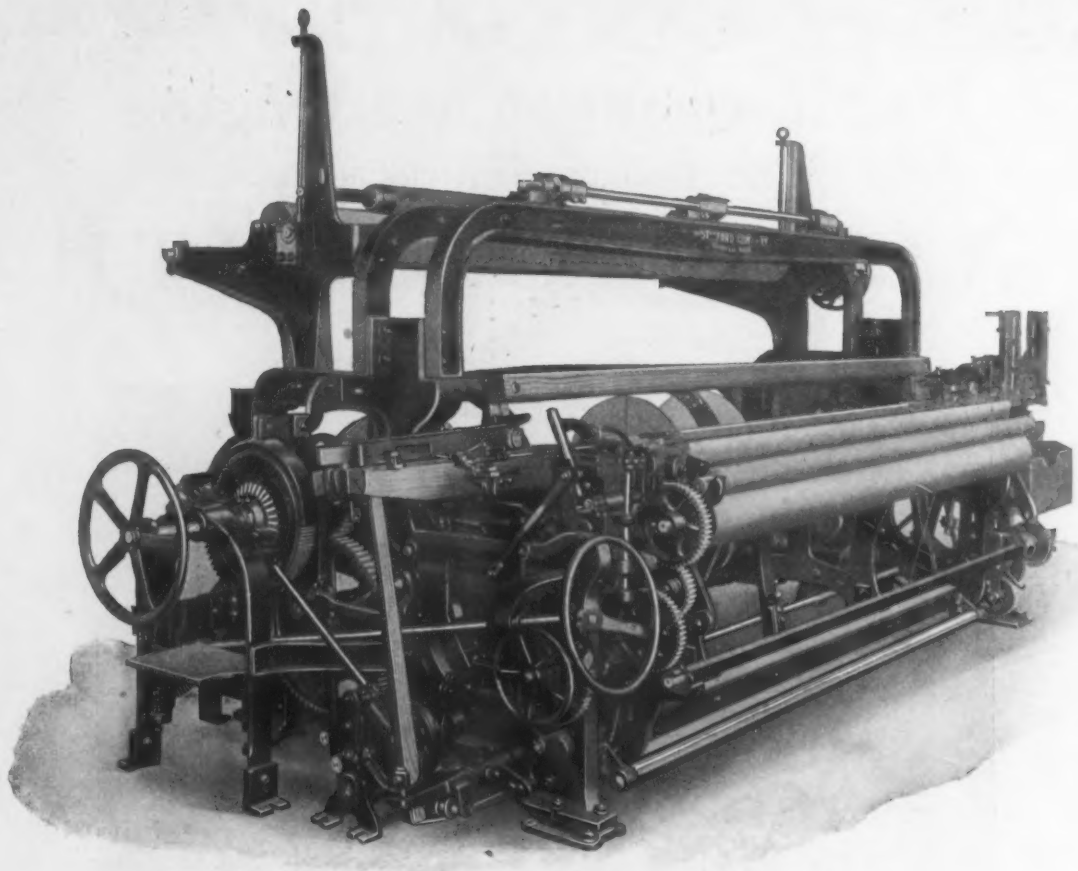
Some of the Manufacturers Using Franklin Machines

Sulloway Mills, Franklin, N. H.
Burson Knitting, Rockford, Ill.
Cooper, Wells & Co., St. Joseph, Mich.
Gibson Mfg. Co., Concord, N. C.
Haines Hosiery Mills, Winston Salem, N. C.
Excelsior Knitting Mills, Union, S. C.
Amoskeag Mfg. Co., Manchester, N. H.
Botany Worsted Mills, Passaic, N. J.
Goodall Worsted Mills, Sanford, Me.
Westmoreland Dye Works, Phila.
Camden Dye Works, Camden, N. J.
J. & J. Dobson, Phila.
Stewart Dyeing & Blea. Co., Salamanca, N. Y.
American Woolen Co., Lawrence, Mass.
Grill Hosiery Mills, Reading, Pa.
Patterson Mills, Roanoke Rapids, N. C.
Wm. Clow & Sons, Laconia, N. H.
Enterprise Dye Works, Woonsocket, R. I.
Renfrew Mfg. Co., N. Adams, Mass.
Monument Mills, Housatonic, Mass.
Dana Warp Mills, Westbrook, Me.
Titlow & Pfeiffle, Wilkes-Barre, Pa.
N. J. Worsted Spinning Co., Passaic, N. J.
Mayfield Woolen Mills, Mayfield, Ky.
Cleveland Woolen Mills, Cleveland, Tenn.
Kent Mfg. Co., Clifton Heights, Pa.

More Franklin Machines were sold and delivered in 1917 than in all previous six years. More Machines sold for delivery during 1918 than in 1917 and all previous seven years.

Franklin Process Company

Providence, R. I.



Tire-Fabric Loom

THE most recent Stafford development in automatic weaving.

Equipped with every known improvement for weaving tire fabrics.

"IDEAL"

The Stafford Company

Readville, Mass.

"IDEAL"

SOUTHERN OFFICE : : : : : : : : : : CHARLOTTE, N. C.

PAPER TUBES

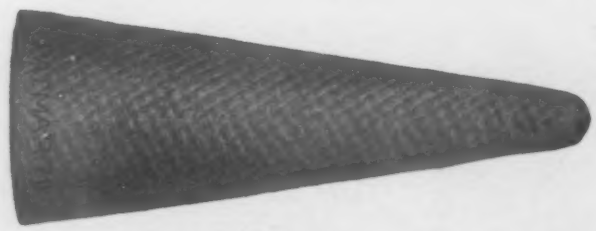
of Fit, Quality and Strength

that will not Collapse or Break are used for

WINDING CLOTH

We also make all other kinds of

PAPER TUBES



See the point of the Patent Perfect Knit-All

CONE

Send for Samples of Cones or Tubes

The PAIRPOINT CORPORATION

NEW BEDFORD, MASS.

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President

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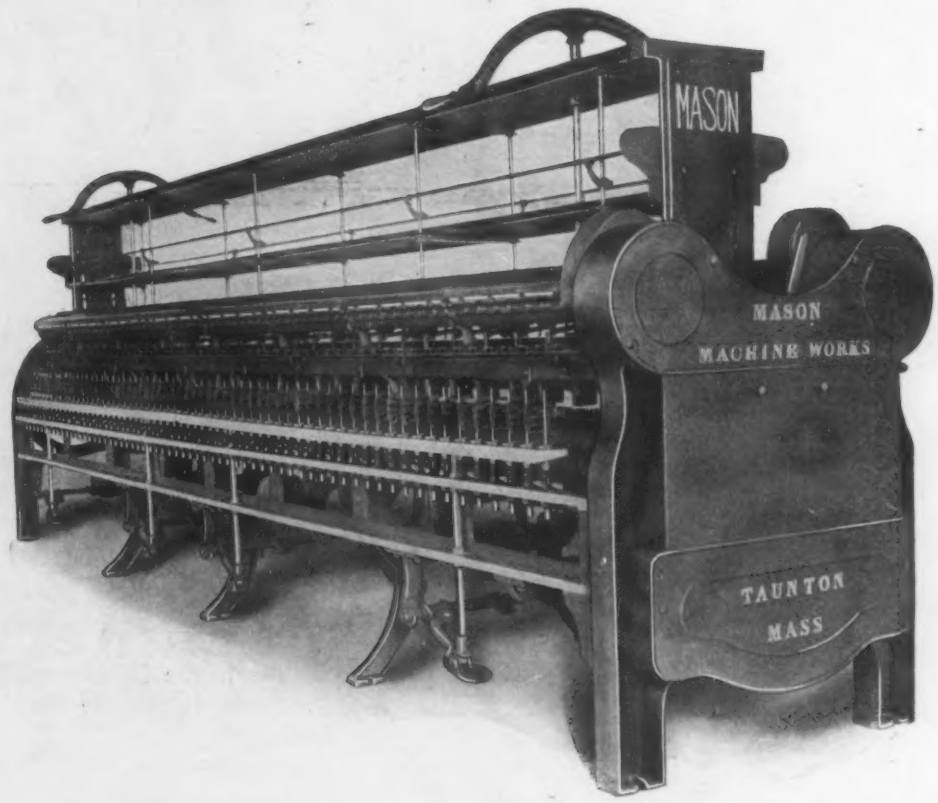
Gen. Manager

MASON MACHINE WORKS

TAUNTON, MASS.



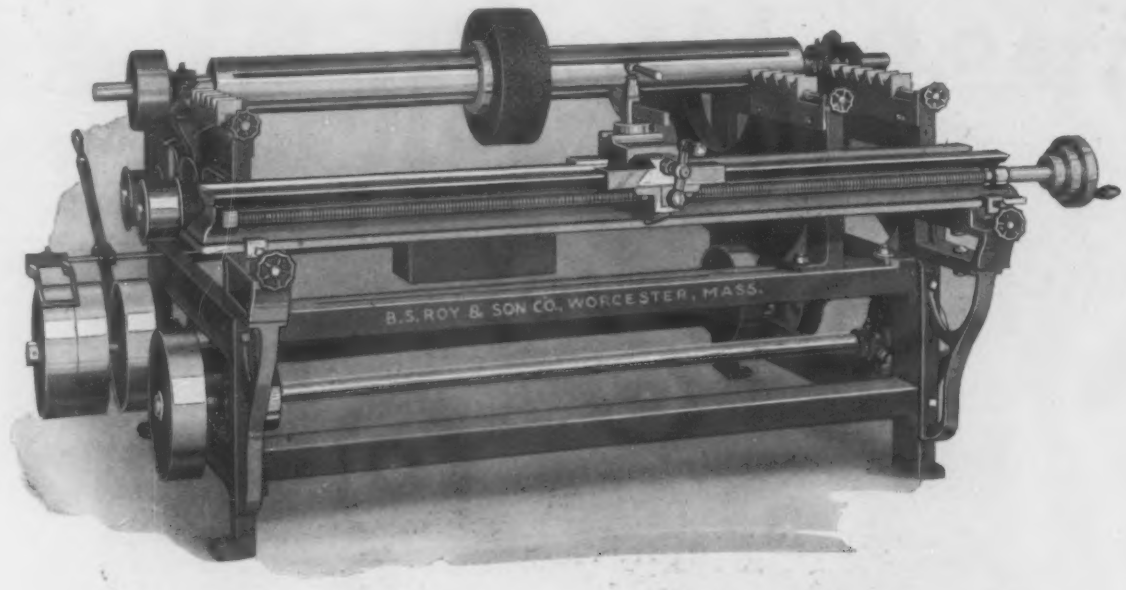
NEW MODEL SPINNING FRAME

We invite investigation of our method of Driving Spinning Frame Spindles by means of Endless tapes. Slack twisted yarn eliminated.

WE ALSO BUILD

REVOLVING FLAT CARDS
DRAWING FRAMES
SPINNING FRAMES
COTTON AND SILK LOOMS
DOBBIES, ETC.

SOUTHERN OFFICE: GREENVILLE, S. C.



We are Specialists

in

Textile Grinding Machinery

WE hold the unique position of being the only concern in the world exclusively devoted to the manufacture and improvement of Grinding Machinery for Textile Mills. By bringing your grinding problems to us, you are assured of getting the best possible equipment for your particular needs.

The illustration shows the Roy Improved Floor Frame Card Grinder and Lathe. This is our latest improved grinding frame for grinding two rolls at the same time. It is constructed throughout of iron and steel and with reasonable treatment should last a life-time. Wherever this machine has been installed, either in this or foreign countries, it has met with instant approval.

Detailed information, prices, etc., gladly furnished. Write for circular

B. S. ROY & SON CO.

WORCESTER MASSACHUSETTS

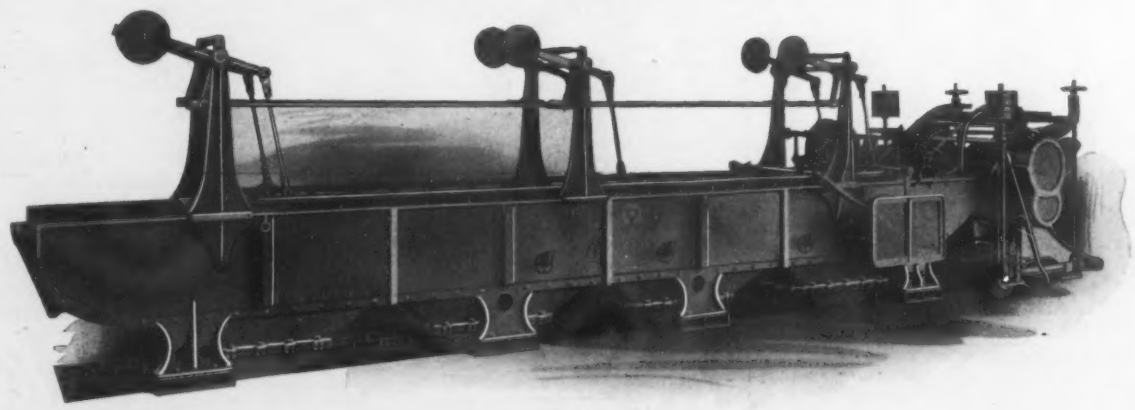
ESTABLISHED IN 1868

IN NATIONAL SERVICE

75% of wool in uniforms of the National Army is washed in

Sargent Wool Washing Machines

They release men by increased production and minimized attention. They meet the problem of shifting labor conditions—as a man of normal intelligence can scour wool successfully on a Sargent Wool Washer. Every device for conservation of time, labor and scouring material has been built in after it has proved its value.



True to their record they are running in day and night service efficiently producing clean, soft and bright wool to clothe the American Army.

C. G. Sargent's Sons Corp.

Graniteville Massachusetts

W. J. WESTAWAY

Canada's Leading Saleshouse

TEXTILE MACHINERY

YARNS—Cotton, Merino, Worsted

COTTON—American, Foreign

We cover the entire field of

TEXTILE MACHINERY TEXTILE ENGINEERING
TEXTILE MILL CONSTRUCTION

Agents in Canada for

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Mercerized Yarns

AMERICAN MOISTENING CO.
BOSTON, MASS.
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PHILADELPHIA, PA.
Finishing Machinery

CANNON MILLS
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Cotton Yarns

C. S. DODGE
LOWELL, MASS.
Rag and Shoddy Pickers

EASTMAN MACHINE CO.
BUFFALO, N. Y.
Electric Cloth Cutting Machines

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Pressure Boiling Kiers

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Spring Knitting Machine Needles

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Trimmings

KLAUDER-WELDON DYEING MACHINE CO.
YARDLEY, PA.
Dyeing, Bleaching, Scouring Machinery

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Bandings, Transmission Rope

LEATHEROID MANUFACTURING CO.
BOSTON, MASS.
"Leatheroid" Mill Products

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CINCINNATI, OHIO
Marking Machines and Rose Label Machines

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CHICAGO, ILL.
Hosiery Drying and Shaping Forms

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NEW YORK, N. Y.
Water Softening Equipment

PHILADELPHIA TEXTILE MACHINERY CO.
PHILADELPHIA, PA.
"Proctor" Dryers

WM. J. QUINN and CO.
PHILADELPHIA, PA.
"Incomparable" Leather Rub Aprons

SCOTT and WILLIAMS, INC.
NEW YORK, N. Y.
Hosiery and Underwear Knitting Machines

HENRY L. SCOTT & CO.
PROVIDENCE, R. I.
Testing Machinery, Yarn Scales and Reels

SOUTHERN TEXTILE MACHINERY CO.
PADUCAH, KY.
Wright Steady Dial Loopers

TOLHURST MACHINE WORKS
TROY, N. Y.
Hydro-Extractors

TOMPKINS BROS. CO.
TROY and SYRACUSE, N. Y.
Knitting Machinery

UNIVERSAL WINDING CO.
BOSTON, MASS.
Winding and Doubling Machinery

VAN LEER and CO.
PHILADELPHIA, PA.
American and Foreign Cotton

WILLCOX and GIBBS SEWING MACHINE CO.
NEW YORK, N. Y.
"Flatlock," "Overlock," "Lockstitch" Sewing Machines

THOS. WOLSTENHOLME SONS & CO., INC.
PHILADELPHIA, PA.
Merino and Worsted Yarns

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Montreal Office
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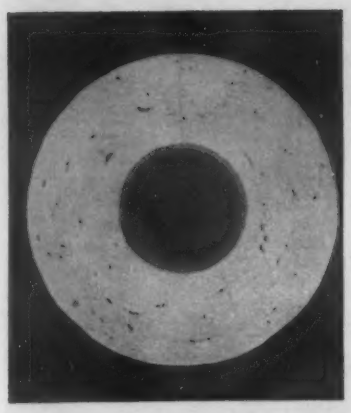
MONTREAL, QUEBEC

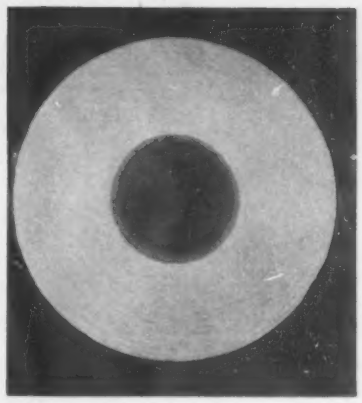
Demonstrating Department, 26 Gore Street, HAMILTON



Knitters--Spinners--Weavers

LISTEN!

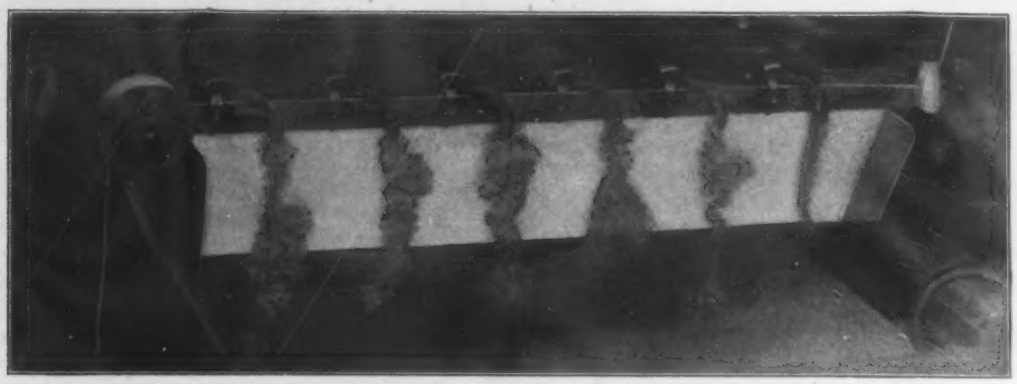
DO you want to save big money? If so, get Jennings' Cleaners and remove the specks, slubs, etc., from your yarns. These are attached to any bobbin, cone, spool or skein winder, and are used in the regular process of winding.



Unclean

Clean

Thousands of Machines Now in Operation



Better Yarns
Better Goods
Less Cost

Jennings' Yarn Cleaning Machine

"The silent inspector that, without any pay, honestly reports bad yarn."

The Jennings' Cleaner is **actually a mechanical yarn cleaner** and not simply one of the numerous more or less useful slub catchers. There is no other device like it in the world. It is in a class by itself, and we have obtained basic patents on it here and in all foreign countries.

Here is what the Jennings' Cleaner can do for YOU

BLEACHING ELIMINATED: Clean your carded yarn with the Jennings' Cleaner and cut out bleaching absolutely. This works perfectly on imitation Egyptian light and heavy weight underwear, Balbriggans, Khaki and Palm Beach cloths, Ducks, Denims, Hosiery or any other kind of dyed underwear or cloth where a clean appearance is important. You can either dye raw stock or cloth without any bleaching at all. Your colors will be evener and more uniform. You will get softer, better feeling goods by getting rid of the bleach and by removing the nibs and lumps you will get smoother, better looking cloth. You will use less dye and save all expense of bleaching and, most important of all, you will save the loss of weight in bleaching which amounts to about 6%. You will have no more trouble from bleach tendered goods. On imitation Egyptian your cloth will look and feel like real Egyptian and won't have the phoney look and harsh feel of bleach dyed cloth.

HOSIERY BENEFITED: Black cotton hosiery and other colors not bleached are greatly improved in appearance by having nibs, lumps, etc., removed by the Jennings' Cleaners and Jennings' cleaned yarn will cut down your holes and save 30% of your seconds, reduce your press offs and save your needles. Bleaching can be absolutely eliminated on colored hosiery and white stockings will have the smooth face and silky look of combed yarn if the nibs and specks have been removed by the Jennings' Cleaners.

WHITE GOODS IMPROVED: Bleach white underwear, hosiery, and white cloths, ladies' knitted and woven dress cloths, sport suitings, etc., are greatly improved in appearance by having the nibs and lumps removed by the Jennings' Cleaners. Single or double carded yarn can be used in place of combed yarns in these white goods and the cloth will have a smooth, clean face and look as well as if made from combed yarns.

SPECKING ELIMINATED: Blanket mills, worsted and woolen mills can do away with the expensive and inefficient operation of hand specking by using the Jennings' Cleaners, and will get really clean blankets and cloth greatly increased in value.

TIRE YARNS AND FABRICS IMPROVED: Use the Jennings' Cleaners and you can drop the grade of your tire yarns. Semi-combed or double carded will do for full combed with a little more twist for strength. Single carded will do for double carded. Breaking out the soft and thin places will improve the strength and durability of your yarn and fabrics. Removing the nibs and lumps will give the fabric a smooth face and the rubber will find nothing loose to hinder its clinging. This is very important, as loose foreign matter on the fabric will cause bubbles and air spaces where the rubber will not be firmly attached.

GRAY SHEETINGS, LININGS, ETC.: All cloths intended for consumption without bleaching are given a superior look of quality by being made from Jennings' cleaned yarn and the saving in seconds and increased loom production is a very important item. Such cloths are gray sheetings (intended for home consumption without bleaching), shoe linings, rubber linings, lace, net, denims, ducks, colored cotton table cloths, mixed silk and cotton ribbons and many others.

COMB YARN SUBSTITUTION: Double carded and good grade single carded yarns cleaned by the Jennings' Cleaners can be used to advantage in place of combed yarns. They will take the place of combed cotton yarns when used as backing yarns for worsted. Double carded yarns made from good long staple cotton can not be told from combed yarns after being cleaned on the Jennings' cleaners. This is very important information for the spinner who has no combers and who would like to get a share of the combed yarn business without putting in combers. He can do it with the Jennings' Cleaners. Semi-combed or partly combed yarns can be made into full combed by being cleaned and the comber waste saving is big. Any grade of yarn can be advanced to a higher grade by being cleaned and the yarn will be stronger because the soft thin places are broken out. Any kind of yarn that is at all dirty can be improved or a cheaper yarn be made to take its place.

THREADS IMPROVED: All kinds of threads and ply yarns are improved in quality and strength by being cleaned on the Jennings' Cleaners. Lumps, dirt and specks that burn the needles and pile up in the sewing machine tensions are removed. Jennings' cleaned threads are a great help in the sewing rooms of garment factories, shoe factories, knitting mills, and in fact, any place using medium and low priced threads or ply yarns. The sewing machines run better and get off more work; operators are better satisfied and less liable to cause trouble and needle breakage and machine repairs are cut down.

LESS SECONDS, NEEDLES & EXPENSE, INCREASED PRODUCTION: Jennings' cleaned yarns will knit and weave better, cut down your seconds 30%, save your needles and machine repairs and increase your production. One man can tend more looms or knitting machines and the work in the cutting and other rooms is easier.

LOWER GRADE COTTON: With the Jennings' Cleaners you can use lower grade cotton and your yarn will be just as strong and cleaner and better in appearance than if made from a higher grade without the Jenning's Cleaners.

SPEEDING UP CARDS: If you wish to increase your carding capacity without putting in more cards you can speed your cards up 30% and your yarn will be just as good and cleaner after being wound through the Jennings' Cleaners.

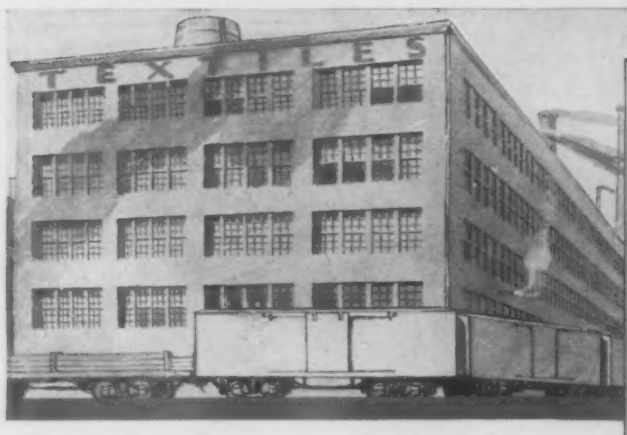
SUMMARY: Jennings' Cleaners will do the work anywhere on any yarn where it is desirable to remove specks, nibs and thick and thin spots. If you make your own yarn and thread or back wind the yarn and thread you buy, by all means get the Jennings' Cleaners and clean it. If you buy and don't back wind, then ask your spinner to furnish you Jennings' cleaned yarn. If he won't do it, write us and we will give you the names of spinners that will.

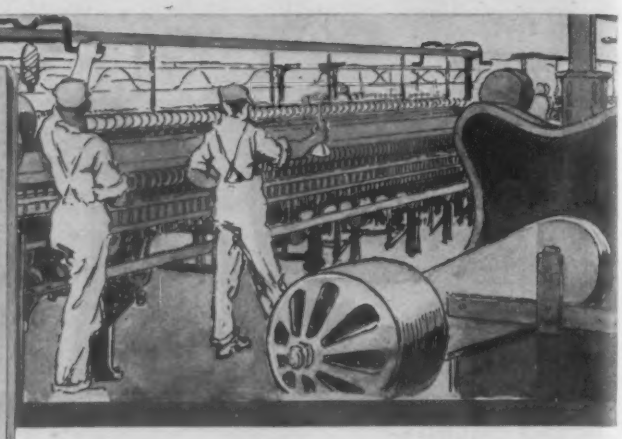
Send us a cone or small quantity of your yarn and thread and we will clean and return it promptly for your inspection.

Tell us what you wish to accomplish and we will do our best to help you.

(Jennings' cleaners will positively show up bad yarn. You will know, because your winders will complain when the yarn is bad. This is important. You ought to know the quality of your yarn no matter whether you buy or make it yourself.)

R. G. Jennings' Yarn Cleaning Machine Co., Elmira, N. Y.





10 Per Cent For Power

FRICTION!

Friction is a tax. It is constantly levied against the cost of machinery operation—against the cost of the finished product. Friction cannot be entirely overcome.

* * * * * *

Power for textile manufacturing averages 10% of the mill selling price. But—engineers agree that 33⅓% of this item is composed of "reducible friction load." In other words, you can reduce that 10% to a minimum by scientific lubrication.

Some Facts and Figures on Textile Mill Operation

—this is a valuable engineering volume, containing definite facts and figures regarding the operation of textile machinery; and data on other mill items.

It treats individually, the several parts of the mill to be considered; the machinery and its parts, production problems, etc. It is a treatise every owner, superintendent, engineer and operative should have.

Sent Free on Request

This book will be sent free to any superintendent, engineer, owner, or operative in charge of textile machinery. Kindly write on business letterhead.

Textile machine lubrication must be considered in terms of dollars and cents economy on 7 important items:

Stained Goods *Rate of Production*
Power Transmission Losses
Power Cost *Replacement Costs*
Repair Time Losses
Mill Conditions

A lubricant to effect savings on these items must flow readily, yet stay "put"; it must not climb, drip nor spatter. Further, it must be adhesive and cohesive, tenuous and elastic. Such a lubricant can be considered ideal for textile use.

SLO-FLO

Slo-Flo is now being widely used in leading textile mills, *because it meets* these requirements.

It was evolved by the S-F Engineering Department, whose 64 years' experience and knowledge are represented in this super-lubricant.

The production of Slo-Flo entailed, in addition to the blending of special crudes, the evolution of a new method—the Acaloric Process. This gives superior heat-absorbing and pressure-resisting abilities to Slo-Flo—makes it non-volatile. Slo-Flo lasts far longer than ordinary lubricants — it saves money.

Complete information and booklets sent on request. Also be sure to send for your copy of "Some Facts and Figures on Textile Mill Operation," mentioned elsewhere on this page.

Profitable connections open to Specialty Jobbers; foundry, mine, railway, textile and other industries; hardware and auto accessory Jobbers and Dealers. Details on request.

SWAN AND FINCH COMPANY
NEW YORK
Quality Oils and Greases Since 1855

SCIENTIFIC LUBRICANTS for SCIENTIFIC LUBRICATION

How Long?

A Brand New Machine:

It is of high quality—because owners and their superintendents are careful to purchase on a "quality first" basis.

How long will it run—and run efficiently?—that is the problem. Machines themselves do not wear out—the bearing parts do. The nation's bone yard is crowded—crowded with thousands of machine parts which, with proper attention to lubrication, could have continued to earn money.

Consider this: If a single bearing part runs for only half an hour without proper lubrication—it is damaged. Perhaps it can be repaired—it may have to be replaced. Time and labor to make the adjustment mean money. Overhead continues. Think of the expense involved. Compare it with the cost of correct lubrication—scientific lubrication, which protects machinery—scientific lubrication, which is cheapest, sometimes even in first cost, always in ultimate cost.

We repeat—machines do not wear out, the parts do. Prolong the life and efficiency of *your* machinery. Protect bearing parts with scientific lubrication.

Scientific Lubricants For Scientific Lubrication

The S-F Engineering Department has spent years in research work in order to offer grease and oil products which will function properly under *extreme* conditions. For example, certain S-F products have super-heat-resisting abilities. In order to produce these lubricants S-F Engineers evolved the new and special Acaloric Process—used only in the manufacture of S-F products.

The cumulative experience gained in 64 years of scientific grease and oil production is represented in each of the 103 products made by the Swan & Finch Company. Each of these is designed to meet a definite condition of service.

Read the brief descriptions; check those that interest you—then mail. In return, complete information and booklets will be gladly sent.

The services of the S-F Engineering Department are free to customers for specific recommendations on individual problems.

SWAN AND FINCH COMPANY
NEW YORK

Quality Oil and Grease Products Since 1853

S-F ATLAS LUBRICANTS

SPECIALTIES

For Gen'l Machine Use

SLO-FLO

—a super lubricant made by the Acaloric Process. Its slow-flowing, clinging qualities prevent climbing, dripping and spattering. It is adhesive and cohesive—heat and pressure resisting—non-volatile. It is extensively used:

—*particularly* for delicate, fast-running machinery in textile and other mills, in printing shops, etc., where neither a fluid oil nor a dense grease is practicable—Slo-Flo stays "put," yet lubricates instantly and constantly.

—for roller bearings in mine-cars, automobiles, etc.—for hydraulic pumps, line-shafting, lighting dynamos in railway cars.

—in railway and other machine shops, in industrial and power plants where excessive heat and bearing pressures must be overcome by a slow-flowing lubricant, which can be used where oil is impracticable or grease impossible.

△ Check here for descriptive literature.

CUPESE

—a special quality cup grease produced by the Acaloric Process; in all densities, from very light to extra heavy.

Its uniform functioning under severest conditions, makes it a practical cup grease for all machinery requirements. Its special non-volatile qualities effect large economies.

Cupese spreads rapidly—withstands excessive heat and bearing pressures, adheres to bearing surfaces, is tenuous and elastic—is *all* lubricant—*absolutely prevents metal-to-metal contact*—it does not liquefy or evaporate under intense heat—does not cake at low temperatures—does not clog bearings or leave residue in cups.

△ Check here for descriptive literature.
Also △ Atlas Engine Oil, △ Atlas Cylinder Oil, △ Atlas Turbine Oil, △ Atlas Dynamo and Motor Oil, △ Atlas Crank Case Oil, △ Atlas Transformer Oil.

For Textile Mills

TEXTUL

—a special oil compound for wool oiling, which has all the good qualities of Red and Lard oils—yet offered at far less cost. Textul saponifies readily — carries well through the carding process and needs no alkali added for emulsion.

△ Check here for descriptive literature.

Slo-Flo is the ideal textile machinery lubricant—see above.

Also △ Atlas Spindle and Loom Oils, △ Atlas Wool Oils.

For Foundries

CORUL

—a special quality liquid core binder that meets the 11 essentials of uniform and economical core-making for malleable and grey iron casting.

11 years of service in the country's leading foundries, and the fact that it is still used by 98% of the original customers, make Corul a tested product, scientifically correct.

△ Check here for descriptive literature.

For Motor Cars and Boats

GEARESE

—a correct lubricant for motor car transmissions and differentials. Reduces friction, reduces wear. Follows the gears continuously, leaving no spots where metal can touch metal. Unaffected by temperature changes. Insures a silent, smooth-running car.

△ Check here for descriptive literature.

MOTUL

—a superior quality motor oil for the protection of valuable automobiles. Its heat-resisting qualities guarantee minimum of carbon—its elastic tenuousness under ring pressures insures maximum seal and cylinder protection.

△ Check here for descriptive literature.

△ Cupese—a special quality cup grease for all requirements.

For Car Journals

ASBESTESE

—a special asbestos and wool mixed grease combination—the result of extensive research, to obviate "hot boxes" and general journal troubles, without excessive cost of frequent repacking and inspection—for steam, electric and logging railways, traction lines, contractors—mine-cars, etc.

Asbestese lasts from four to eight months without repacking or oiling. It is scientifically made—every barrel uniform. It gives efficient lubrication to bearings and, properly packed, prevents entrance of road dust and sand in journal boxes. Its savings in inspection costs and waste of free oil are obvious.

△ Check here for descriptive literature.

For Drop Forges

TALESE

Die-swabbing requires a product which will perform an absolute separation of the metals—have a low flash tendency and function with a minimum of smoke. These requirements are met by Talese, at surprisingly small cost.

△ Check here for descriptive literature.

Miscellaneous

△ Aerul—a practical quality oil for aeroplane motors. The correct viscosity combined with proper cold test values gives perfect seal and maximum horse power with safety assurance.

△ Marinul—a world-known special oil produced to meet the excessive stresses of marine service.

△ Exese—the 600° F. lubricant for oven gears, bloom cars or lubrication under excessive heat conditions anywhere.

△ Vesuvese—a water-proof lubricant—for exposed gears—for wire cable dressing.

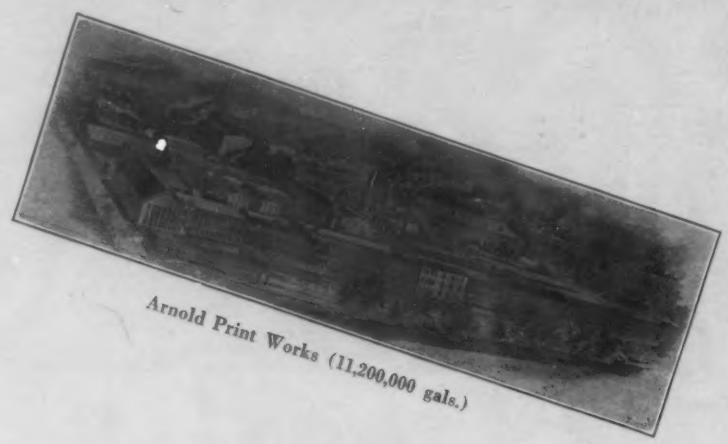
△ Larcul—a practical, economical, metal-cutting lubricant.

Also △ Atlas Cutting Oils, △ Atlas Tempering and Quenching Oils, △ Atlas Leather Oils and Greases, △ Atlas Fish Oils.

Profitable connections open to Specialty Jobbers; foundry, mine, railway, textile and other industries; hardware and auto access. Jobbers and Dealers. Details on reques[t]

SCIENTIFIC LUBRICANTS for SCIENTIFIC LUBRICATION

Pacific Mills Print Works (23,500,000 gals.)



Arnold Print Works (11,200,000 gals.)

CLEAN WATER

is essential to the Bleaching, Dyeing and Finishing Processes

Your product, to be sold, must be *clean.* This is possible only when clean water has been used. You cannot produce those delicate shades without pure water.

NORWOOD FILTERS

remove every particle of suspended matter, grit and dirt. No matter how contaminated the supply, a NORWOOD can transform it into pure water. ***We guarantee this.***

The expense of installing a NORWOOD FILTER is trifling compared with the savings resulting from the reduction of seconds and the higher quality of product. Furthermore it takes *less time* and *less cleanser* to wash with *clean water.*

Hundreds of mills have been equipped with NORWOOD FILTERING PLANTS. These range in size from the smallest to the largest installation in the world—the Pacific Mills Print Works, where 23,500,000 gallons of clean water are supplied every ten hours.

No matter how many gallons of water you use, we can install a NORWOOD which will pay for itself in a short time. You cannot afford to market seconds while other mills market firsts.

Tell us what your conditions are and we will tell you how much a NORWOOD FILTER will cost and what it will save. We quote the figures. You make the decision. And remember, the NORWOOD is the filter with the guarantee.

NORWOOD ENGINEERING CO.

Florence, Mass.

Better Belting Will Cost You Less

Impossible? Not at all. Figure your belting costs RIGHT — which too many belt users don't do—and you'll see the point.

Here are the items in belting cost, rightly figured:—first cost of belt; repair costs; power wasted when the belt isn't right; value of idle time while belt repairs or adjustments are being made; value of output lost while machines are idle because of belting troubles.

Make the first item—first cost—low, and you'll run up the other items—the after costs.

Make the first item right, and you'll minimize the after costs.

It's up to you—it isn't what you pay, but what you buy, that counts in the belting economy question.

For more than 30 years, LADEW LEATHER BELTING has been made with the single idea of keeping belting costs down. Which is a far more difficult proposition—requires more "know how"—than to make belting that will meet cheap competition.

Ladew Engineering Service will help you to higher belting economies. Try it — be convinced.

EDW. R. LADEW CO., INC.
GLEN COVE, NEW YORK, U.S.A.

BELTING

The Piping Problem which confronted this Dye Works must be solved by many others sooner or later

This is one of three mills constituting one of the largest plants of its kind in the world.

For some years this company used rolled metal pipe for its underground water distribution.

Losses by corrosion from the outside, resulting in destruction of the pipe, and rust flakes from the inside discoloring the filtered water, with consequent ruin of expensive dyes, led this company to the use of Cast Iron Pipe.

The daily water supply averages over ten million gallons and from the pump well intake to the waste dye outlets only cast iron pipe is now used, in sizes as large as 30 inches diameter.

THE FIRST CAST IRON PIPE EVER MADE IN THE WORLD'S HISTORY IS STILL IN SERVICE
SERVICE
CAST IRON PIPE
MEASURED BY
CAST IRON PIPE
CENTURIES
MORE THAN 250 YEARS OLD

The Cast Iron Pipe Publicity Bureau
1 Broadway New York

"The Standard" Scales—Noted for Their "Continued Accuracy"

Efficient Buying is getting maximum returns for the money invested. In Scales the "returns" *should* be ACCURATE WEIGHING, not merely for a week or a month but for years.

Accuracy is built into "The Standard" Scales—accuracy in materials, in workmanship, in design and in the patented devices employed. This explains why these Scales are so universally used in textile mills and other plants of all kinds, where equipment is selected only after thorough tests and investigations.

The *safe* way is to specify "The Standard." These Scales are made in a variety of models and sizes to weigh anything from a fraction of an ounce to a car load. Catalog No. 81 contains many helpful suggestions for the mill man; we will gladly send you a copy. For information about mill trucks, baskets and other mill supplies, write for Catalog D 81.

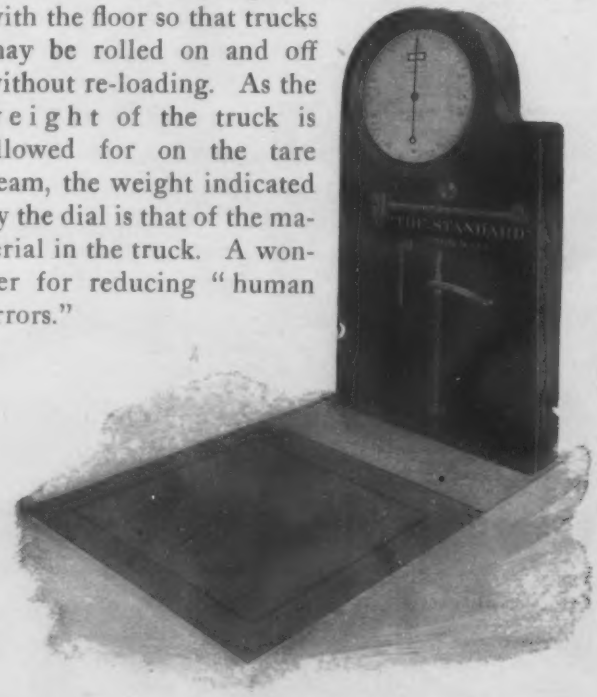
"The Standard" Dormant Warehouse Scale

The adaptability of this Scale to textile use is evidenced in the large number of mills using this model.

The platform is set level with the floor, so that 2 or 4 wheel trucks may be handled on it without lifting the material on and off the scale. This model may be had in various sizes; we will gladly help you select the one best suited to your needs.

"The Standard" Automatic Dial Scale

is one of our latest, improved models. It is flush with the floor so that trucks may be rolled on and off without re-loading. As the weight of the truck is allowed for on the tare beam, the weight indicated by the dial is that of the material in the truck. A wonder for reducing "human errors."



THE STANDARD SCALE & SUPPLY CO.

1631 Liberty Avenue, Pittsburgh, Pa.

NEW YORK	PHILADELPHIA	BALTIMORE	CHICAGO	CLEVELAND
145 Chambers St.	523 Arch Street	409 N. Gay St.	163-171 N. May St.	1547 Columbus Rd.

GRATON & KNIGHT
Standardized Series
LEATHER BELTING

Tanned by us for belting use

GRATON AND KNIGHT

Coal—Power—Belts—Production

YOU invest your money in coal to get power—POWER—the basis of production. If power leaks out in transmission, *it never becomes production.*

That is why selection of the belting that will transmit the greatest amount of power is a vital matter. It does not receive the careful study which it demands.

First: Use *leather* belting—the material that guarantees least power leakage; that is standard for main drives; that stands the mauling of shifters; that can be easily spliced and repaired; that when partly worn can be cut down for narrower pulleys; that has greatest elasticity and pulley-grip.

Second: Don't select belting on specification. Select it on scientific adaptation to the *work to be done.* Right here is the reason for the superiority of Graton & Knight Standardized Series Leather Belting.

Twenty mills with practically identical needs often specify twenty varied types of belting. And yet the requirements of power transmission fall into a relatively small number of classifications. For each of those classes there is a Graton & Knight Standardized Belt. Long study and experience fixed that standard and we keep it there—rigidly.

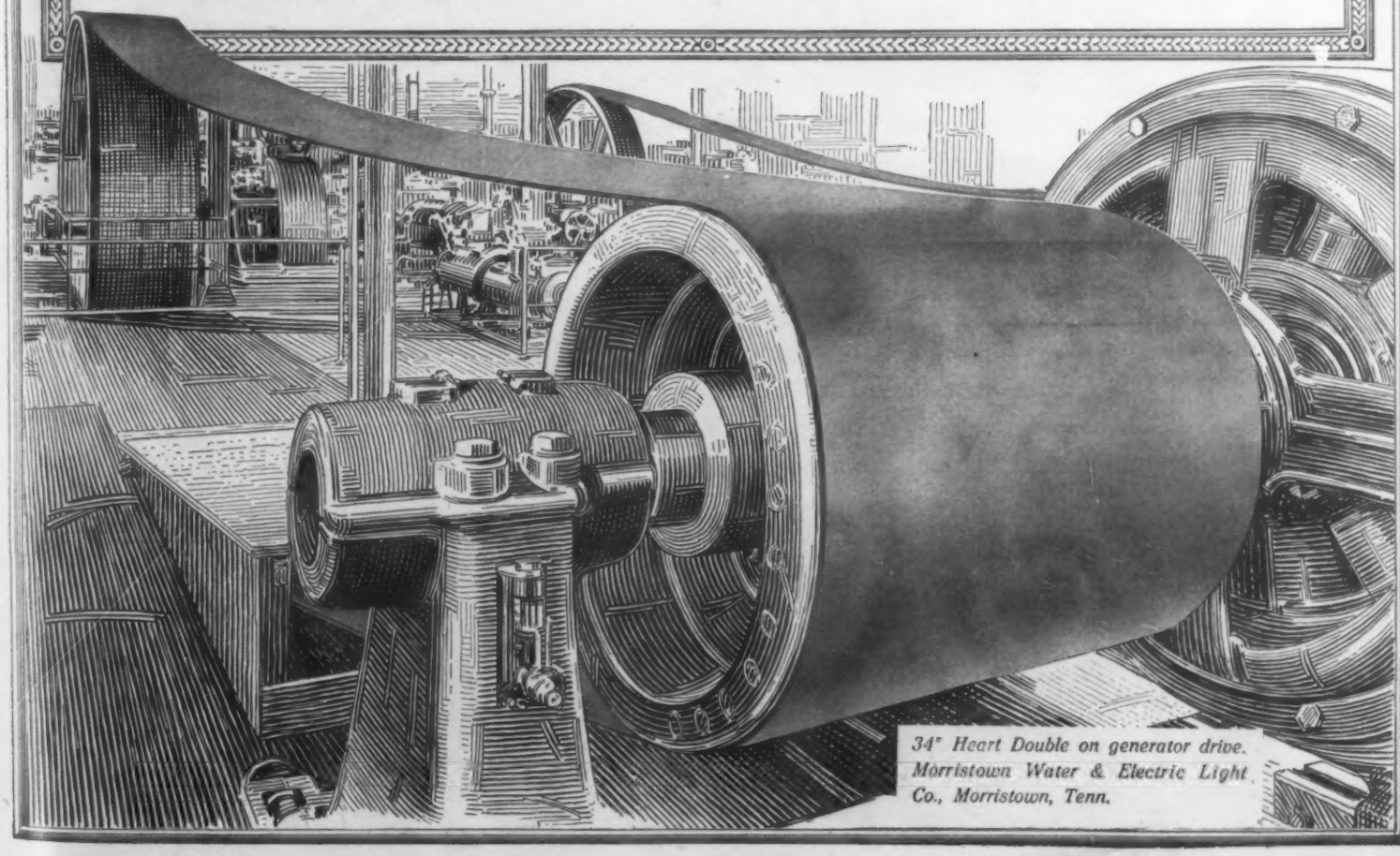
It will work an economy for you if you will let us specify the grade of belt for each pulley in your plant. Then, when you buy belting, call for "Graton & Knight ——— Brand or equal." This doesn't commit you to buying our belting. It puts your buying squarely and permanently on the only sound basis—the *work to be done.*

THE GRATON & KNIGHT MANUFACTURING COMPANY, Worcester, Massachusetts, U. S. A.

Oak Leather Tanners, Makers of Leather Belting, Lace Leather, Packings, and Specialties

BRANCHES—Atlanta, Boston, Chicago, Cleveland, Detroit, Fall River, Kansas City, Minneapolis, New Orleans, New York, Philadelphia, Pittsburg, Portland, Ore., St. Louis, Seattle; Leicester, England.

SELLING AGENTS—Graton & Knight Mfg. Co. of Texas, Dallas, Texas; Graton & Knight Mfg. Co. of Wis., Milwaukee, Wis.; Graton & Knight Mfg. Co. of Cal., San Francisco, Cal.



34" Heart Double on generator drive. Morristown Water & Electric Light Co., Morristown, Tenn.

Why Thomas Grate Bars Reduce Fuel Costs

To many men the grate is merely "a foundation for the fuel." But men who use or have investigated Thomas Grates know that a grate *can* be an important factor in reducing the fuel bill and cutting the power plant pay roll—two important items right now.

Briefly, Thomas Elliptic Grate Bars increase the steaming power, because of even fires and better combustion. They absolutely eliminate the hoe, rake and slash bars and operate *without a cleaning period.*

The efficiency of these bars is due to their elliptic shape and eccentric movement, which is controlled by a lever, as illustrated. Shifting the lever through a small angle peels the fine ash from its lodgement, *without disturbing the fuel bed;* the coarse refuse is dropped out by giving the lever a little longer stroke. A full stroke of the lever throws the bar at an angle of 85° with a 3½ inch space between the bars, dropping everything into the pit.

In *normal* times Thomas Grate Bars save their cost every few months (the average being two to four) by reducing former excessive fuel. In these *critical* times of fuel shortage, these grates are invaluable as money savers. Write now for full particulars, sending us the following information.

No. of boilers used.....

No. of doors to front.....

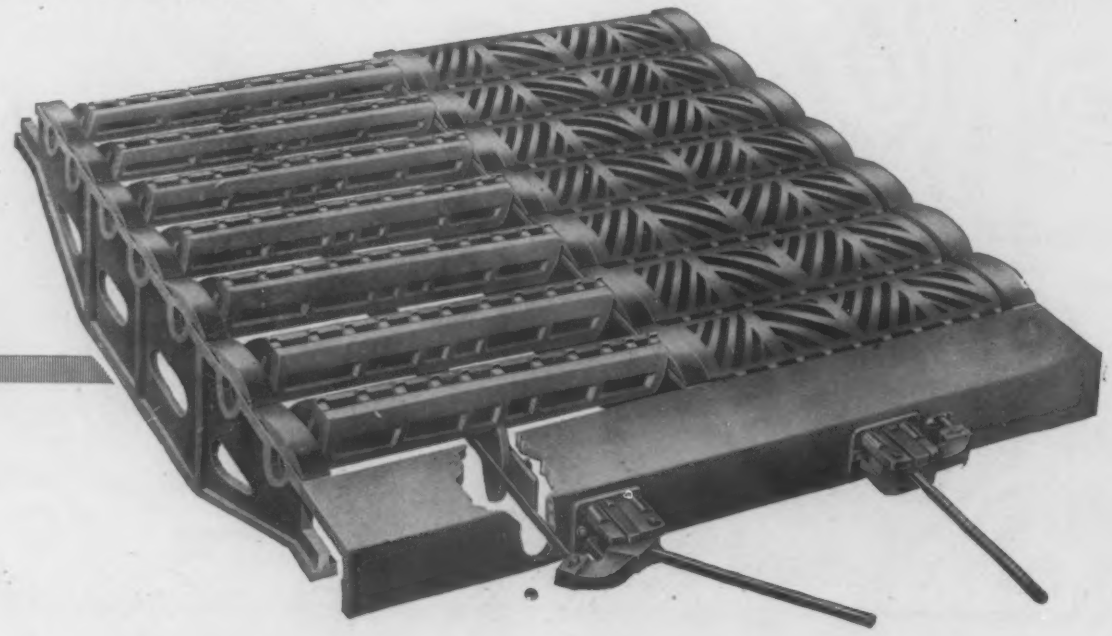
Size of grate areas side wall to side wall.....

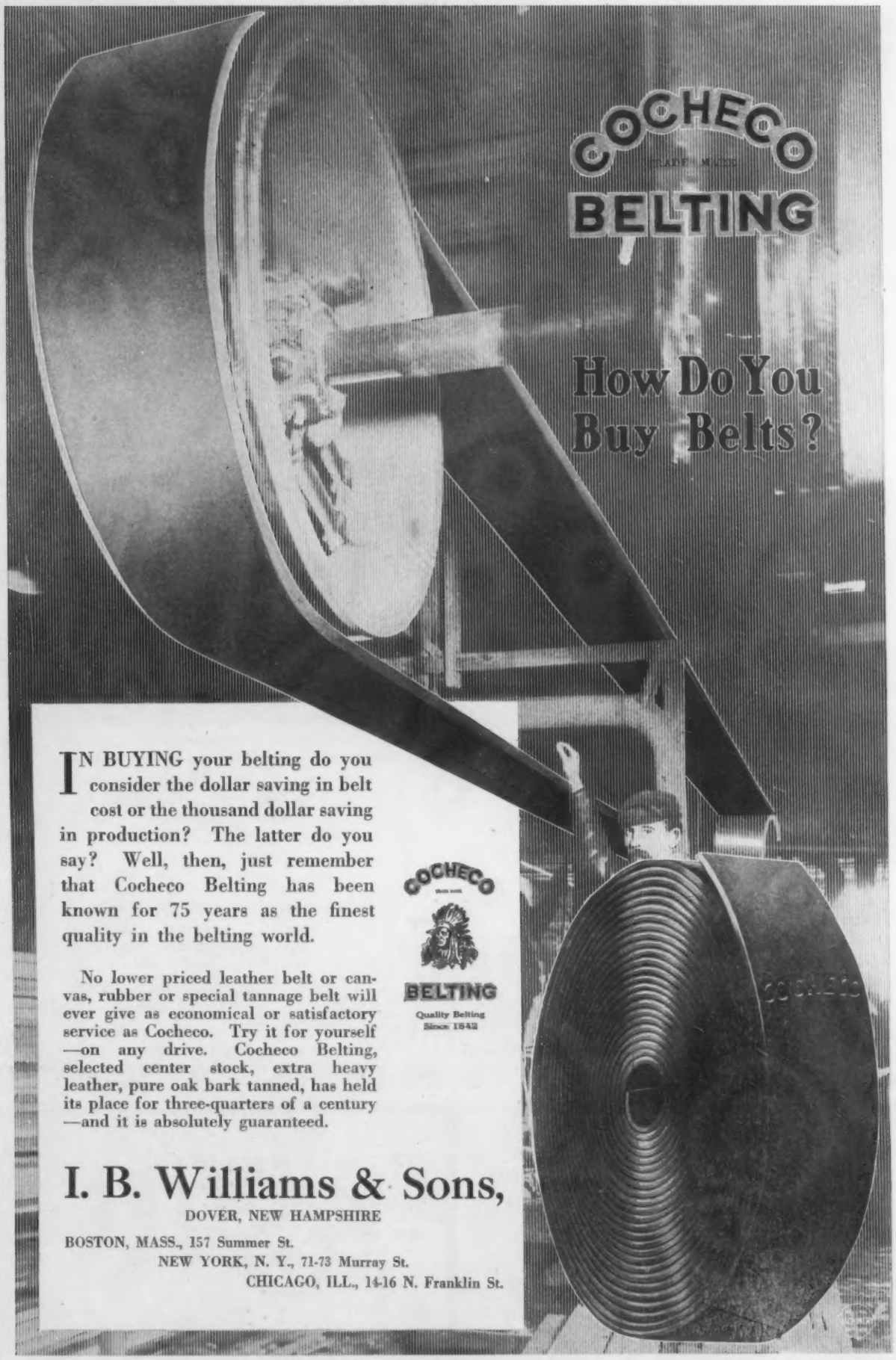
Distance between front plate and bridge wall.....

Kind and class of fuel used.....

THOMAS GRATE BAR COMPANY

Birmingham - Alabama





IN BUYING your belting do you consider the dollar saving in belt cost or the thousand dollar saving in production? The latter do you say? Well, then, just remember that Cocheco Belting has been known for 75 years as the finest quality in the belting world.

No lower priced leather belt or canvas, rubber or special tannage belt will ever give as economical or satisfactory service as Cocheco. Try it for yourself —on any drive. Cocheco Belting, selected center stock, extra heavy leather, pure oak bark tanned, has held its place for three-quarters of a century —and it is absolutely guaranteed.

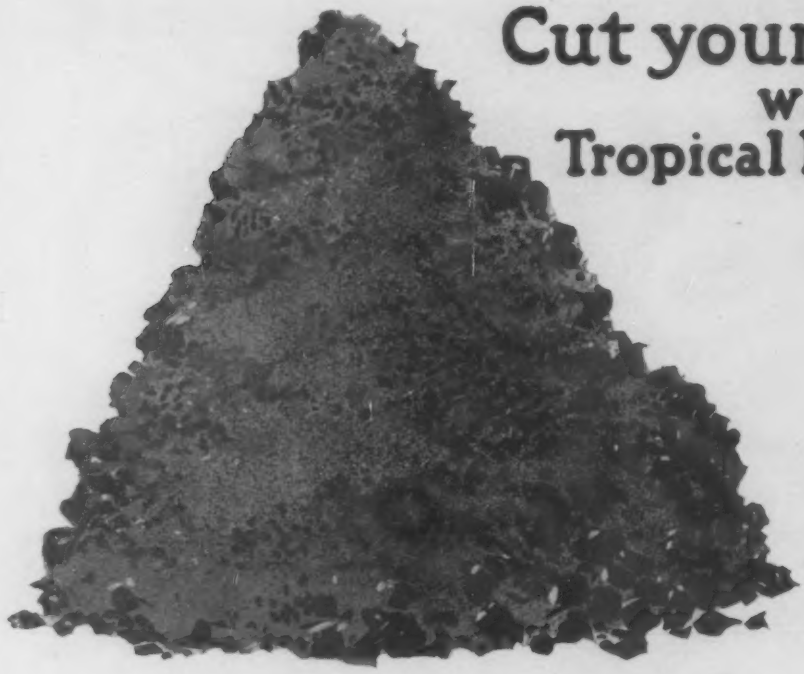
COCHECO
BELTING
Quality Belting
Since 1842

I. B. Williams & Sons,

DOVER, NEW HAMPSHIRE

BOSTON, MASS., 157 Summer St.
NEW YORK, N. Y., 71-73 Murray St.
CHICAGO, ILL., 14-16 N. Franklin St.

Cut your Fuel Bill with Tropical Boiler Seal



Each Pile of Coal Made the Same Amount of Steam

The difference in the size of the coal piles shows the amount of coal Tropical Boiler Seal saves for the Ft. Wayne & Northern Indiana Traction Co. of Ft. Wayne, Ind.

Since applying Tropical Boiler Seal, this company uses only four-fifths as much coal as before, to make the same amount of steam.

This is a money saving of about $25.00 per day.

Every Textile Mill

can also cut their fuel bill by using Tropical Boiler Seal, no matter whether they use coal, oil or wood.

The amount of fuel saved will vary from 4 per cent. to 20 per cent., according to the present conditions of the Boiler Settings.

Tropical Boiler Seal

is a plastic cement, that is applied with a trowel to the outer walls and roofs of Boiler Settings.

It is made from long fibre asbestos and heat resisting oils and pigments—will withstand 550 degrees F.

It bakes on forming an air-tight sheet over the whole setting, which will not crack, but keeps elastic and pliable.

Made in Red, Black, Gray and Green.

What it Does

It absolutely prevents the leakage of cold air through Boiler Settings.

New boiler settings settle and develop cracks and are more or less porous. Old Settings are very porous.

Cold air drawn through these pores and cracks, cools the furnace gases and lessens their efficiency.

Cut off these leaks with Tropical Boiler Seal and the same amount of steam is made with less fuel.

Today Is The Best Time

to send for prices, and complete information on how to cut your fuel bill.

Every day dollars are being lost in your power plant, which Tropical Boiler Seal will save.

The coupon foryour ready convenience.

This Is Your Opportunity To Conserve Fuel

The Tropical Paint & Oil Company -:- Cleveland, Ohio

These Firms Have Cut Their Fuel Bills By Using Tropical Boiler Seal

Case School of Applied Science	Cleveland, O.
Warner & Swasey Co.	"
City Ice Delivery Co.	"
Public Service Corporation	Chicago, Ill.
Duquesne Light & Power Co.	Pittsburgh, Pa.
City of St. Louis, City Hall	St. Louis, Mo.
East Side Packing Co.	East St. Louis
Union Electric Light & Power Co.	St. Louis, Mo.
Illinois Traction Co.	Peoria, Ill.
E. St. Louis Cotton Oil Co.	Nat'l Stock Yards, Ill.
The American Brass Co.	Kenosha, Wis.
F. M. Sinclair & Co., Ltd.	Cedar Rapids, Ia.
Des Moines Gas Co.	Des Moines, Ia.
Iowa Railway & Light Co.	Cedar Rapids, Ia.
Citizens Gas & Electric Co.	Philadelphia, Pa.
American Car & Foundry Co.	Madison, Ill.
Laclede Steel Co.	Alton, Ill.
American Steel Foundries Co.	Granite City, Ill.
American Oak Leather Co.	Louisville, Ky.
Standard Sanitary Mfg. Co.	Louisville, Ky.

COUPON

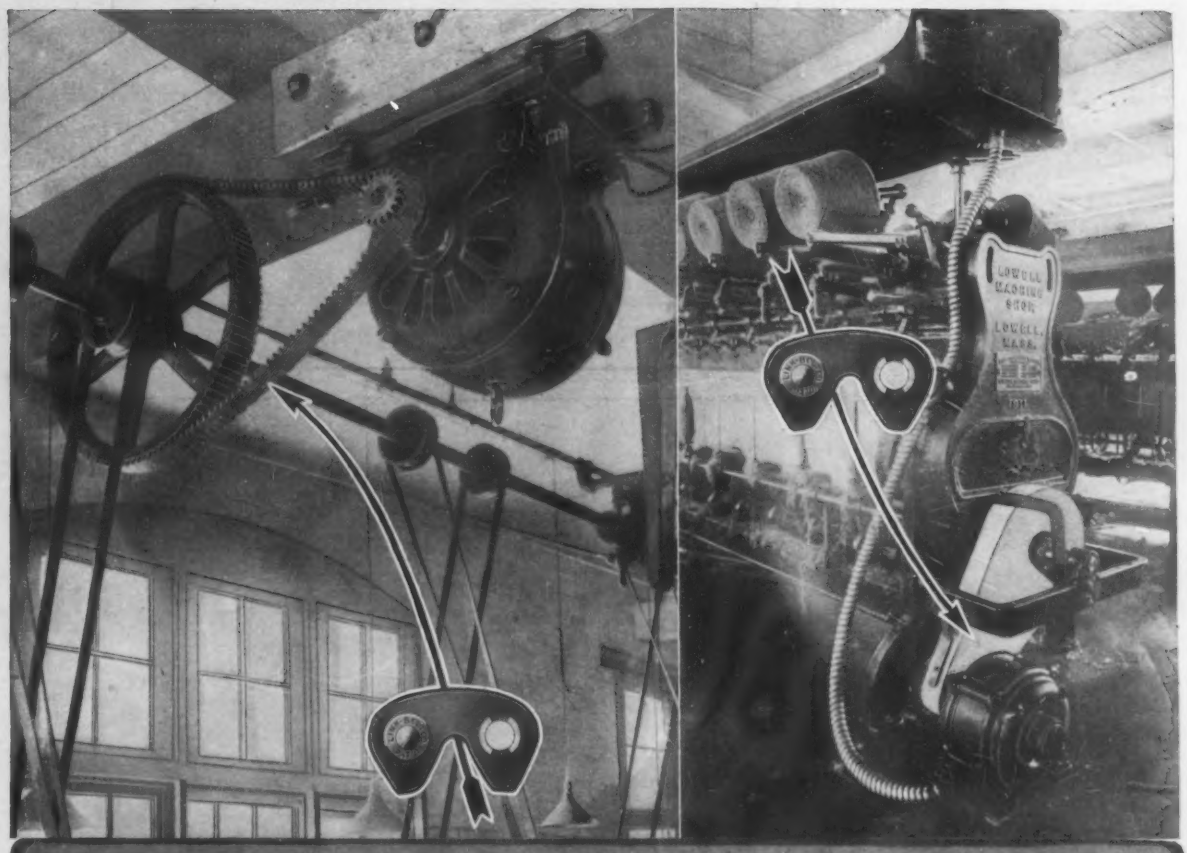
The Tropical Paint & Oil Co.,
Dept. 304 A, Cleveland, O.

We would like to cut our fuel bills. Send us prices and complete information on Tropical Boiler Seal.

Name _____

City _____ *State* _____

Amount of external surface of Settings _____ *sq. ft.*



EFFICIENT POWER TRANSMISSION

IN these trying times when every Plant is endeavoring to operate to its full capacity, there should be no tolerance of slip or loss of power in transmission, from the prime mover to the driven machine.

Now, if never before, efficient methods must take preference over time-worn methods. Today is the day when results count. Even the best is none too good.

You owe it to yourself and your country to economize power, use efficient equipment, and get better results from your plant than ever before in the history of our country.

Link-Belt Silent Chain is over 98% efficient—it transmits power without slip or loss—with the flexibility of the leather belt and the positiveness of gears.

If you cannot adopt this drive now, send for our Data Book telling how to transmit power efficiently to every machine in your plant.

LINK-BELT SILENT CHAIN DRIVES

LINK-BELT COMPANY 92

PHILADELPHIA CHICAGO INDIANAPOLIS

New York - - - - - - 299 Broadway	Buffalo - - - - 698 Ellicott Square	Birmingham	McCrossin & Darrah, Am. Tr. Bldg.
Boston - - - - - - 49 Federal St.	Wilkes-Barre - - - 2d Nat'l Bank Bldg.	New Orleans	C. O. Hinz, Hibernia Bank Bldg.
Pittsburgh - - - - - 1501 Park Bldg.	Cleveland - - - - 429 Rockefeller Bldg.	Charlotte, N. C.	J. S. Cothran, Com'l Bk. Bldg.
St. Louis - - - - Cont'l Nat'l Bank Bldg.	Detroit - - - - 732 Dime Bank Bldg.	Toronto, Can.	Canadian Link-Belt Co., Ltd.
	Minneapolis - - - - 418 S. Third St.		
	Kansas City, Mo. - - - 407 Finance Bldg.		
	Seattle - - - - 576 First Ave., S.		
	Portland, Ore. - - - First and Stark Sts.		
	San Francisco - - - 461 Market St.		
	Los Angeles - - - 161 N. Los Angeles St.		
	Denver Lindroth, Shubart & Co., Boston Bldg.		
	Louisville, Ky. Frederick Wehle, Starks Bldg.		
	Knoxville, Tenn. D. T. Blakey, Empire Bldg.		

Earning Bigger Profits for their Employers

While the employees in this big plant are earning better wages for themselves, they are earning bigger profits for their employers.

Why? Because they have better light, because they can do better work and because they make fewer mistakes and have less spoilage.

We can show you in simple arithmetic how Glidden DayLite Mill White is more economical than the kind of low-price-per-gallon paint that brings you frequent repainting costs. Glidden DayLite Mill White is quality through and through.

Glidden DayLite is made in gloss and flat. Let our DayLite experts help solve your lighting problem. "More Daylight" is the title of a practical book on this subject, we'll gladly send you.

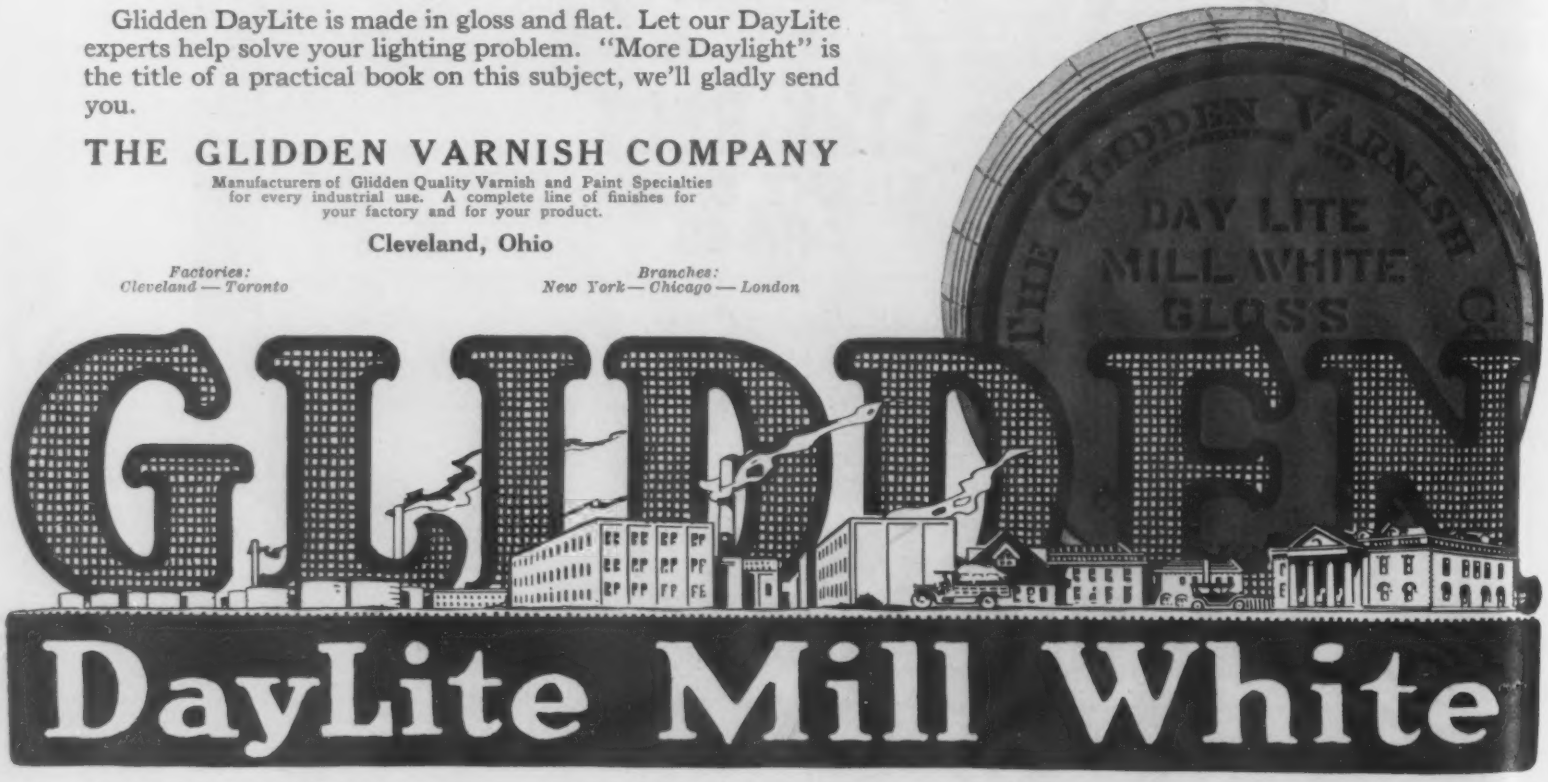
THE GLIDDEN VARNISH COMPANY

Manufacturers of Glidden Quality Varnish and Paint Specialties for every industrial use. A complete line of finishes for your factory and for your product.

Cleveland, Ohio

Factories:
Cleveland — Toronto

Branches:
New York — Chicago — London



SKF

Equipped

FANS

and

BLOWERS

A BALL BEARING FAN HAS THESE ADVANTAGES

No Shut Downs or Interruptions

There is no danger of hot bearings where SKF Ball Bearings are used, because the bearing friction is so slight that a no-temperature rise condition prevails. Fans equipped with SKF Ball Bearings can be speeded up without danger of hot bearings.

Saving in Lubrication

SKF equipped fans require lubrication but three or four times a year. Sealed housings for the bearings prevent the leakage of lubricant or the intrusion of foreign matter.

Belt Savings

The freedom from dripping oil keeps belts "alive." Because ball bearing fans run so easily narrower and slacker belts may be used.

Reduced Maintenance

SKF Ball Bearing equipped fans require no attention—no repairs or adjustment. After long service they show no appreciable wear.

Let us help you put your fan and blowers on the most efficient basis. A postal brings you detailed information.

SKF BALL BEARING CO.

HARTFORD CONN.

An Epoch-Making Factory

The first factory ever built, embodying a practical method of lighting and ventilating a virtually unlimited floor space by purely natural means.

Its product is the Delco Light for country homes—but it might have been textiles. For the skill and rapidity required of the workers abundant fresh air and light are necessary.

There is not a dim or stuffy corner in the building. Yet it will be, eventually, six times its present size, or 870 by 2000 feet, all under one continuous 40-acre roof!

Air and light enter, and air is discharged, through openings in the roof itself. The inverted roof slopes, leading directly to the outlets, insure complete scavenging of stale air and prevent cross winds from blowing through.

Both outlets and inlets are protected by weather proof continuous sash, operated in unbroken lines of 400 and 600 feet by electric motors. Being of equal area, they ensure uniform air renewal throughout the entire floor. The lighting effect is shown by the photograph.

This remarkable building is described, with a number of others having better than usual lighting and ventilation, in a booklet, "Air, Light, and Efficiency." Free on request.

Let us help solve your lighting and ventilating problems.

Domestic Engineering Co., Moraine, O. Schenck & Williams, Architects. Present section 270 ft. wide, 1000 ft. long. Roof is a series of Pond Trusses, with Pond A-frame inlets between. Pond Continuous Sash, top-hung and overlapping storm panels at the ends, used in all roof inlets and outlets, with Pond Operating Device, Motor Driven. Lupton Factory Sash in side walls.

LUPTON PRODUCTS

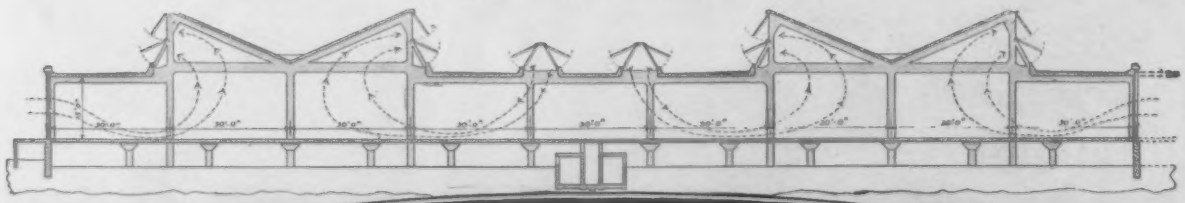
Lupton Steel Sash
- Pivoted Factory Type
- Counterbalanced Type for factories
- Counterweighted Type for offices
- Power House Type

Pond Continuous Sash for Pond Truss, sawtooths, monitors and side walls
Pond Operating Device for long lines of sash
Lupton Rolled Steel Skylight
Lupton Steel Partition and Doors
Lupton Steel Shelving

DAVID LUPTON'S SONS COMPANY

Trenton and Allegheny Avenues Philadelphia, Pa.

Makers of equipment for daylighting and natural ventilation



STEEL SASH — PARTITIONS — DOORS

LUPTON

"INVESTMENT VALUE"

GOODRICH
BELTS
For the Cotton Mill

Are especially designed and built by a corps of able belt engineers to increase the efficiency of the cotton mill.

Every condition under which these Belts will be used has been painstakingly analyzed for data,—it is impossible for a **GOODRICH** customer to make a haphazard selection of a Belt for cotton mill use.

Rubber, fabric plies, durability—everything which would have a bearing on service, have been closely studied in their individual relations to the wear and tear of the various cotton mill uses.

The results, judging by a wealth of actual performance, for longer or shorter periods, prove conclusively the superiority of **GOODRICH** Belts for

All Main and Countershaft Drives, Openers, Breakers, Cards, Spoolers, Warpers, Slashers and heavy Looms where Friction Drives are used.

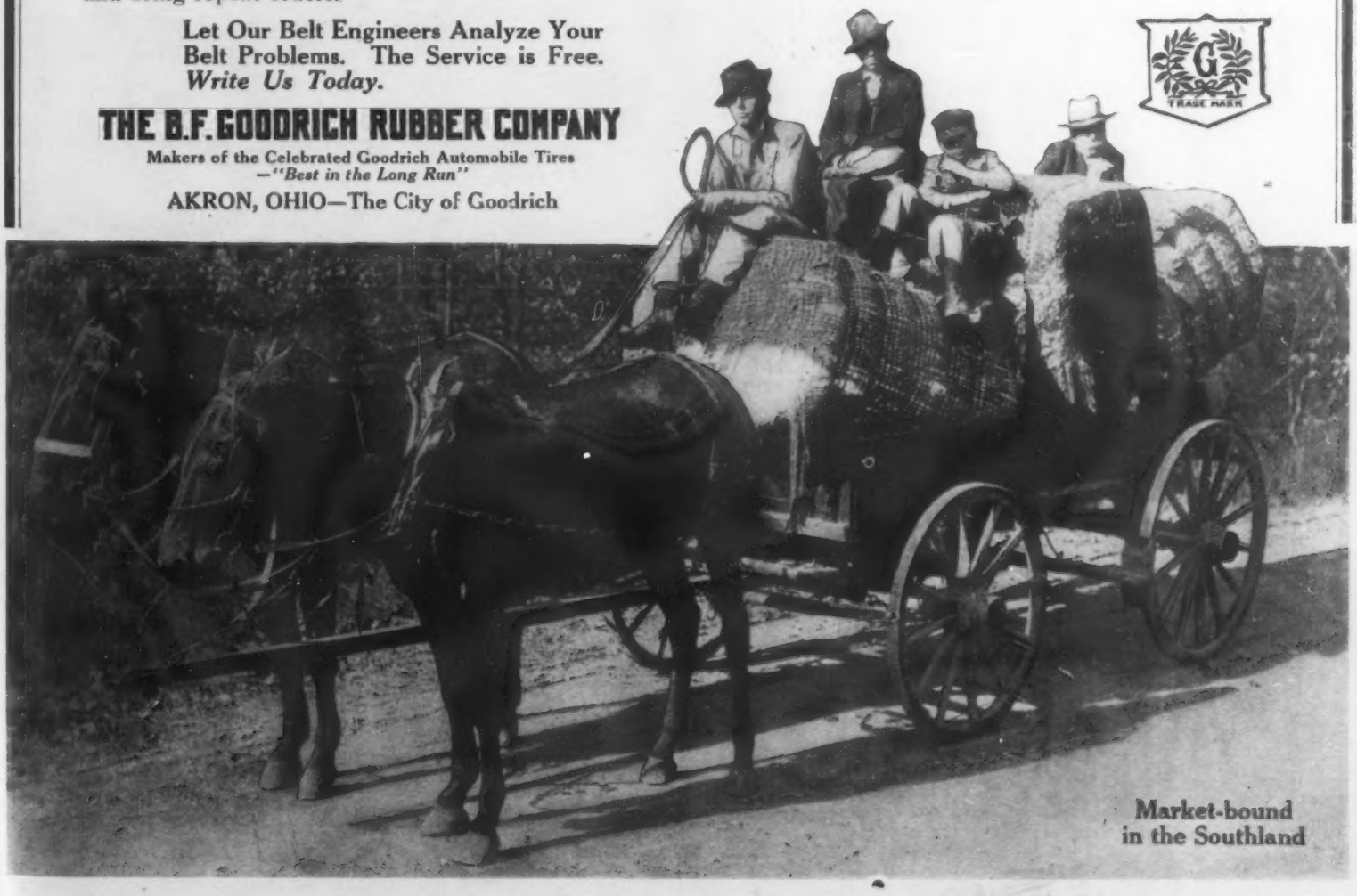
There is a **GOODRICH** Belt for every one of these uses and every Belt will satisfy from the start—and bring repeat orders.

Let Our Belt Engineers Analyze Your Belt Problems. The Service is Free.
Write Us Today.

THE B.F.GOODRICH RUBBER COMPANY

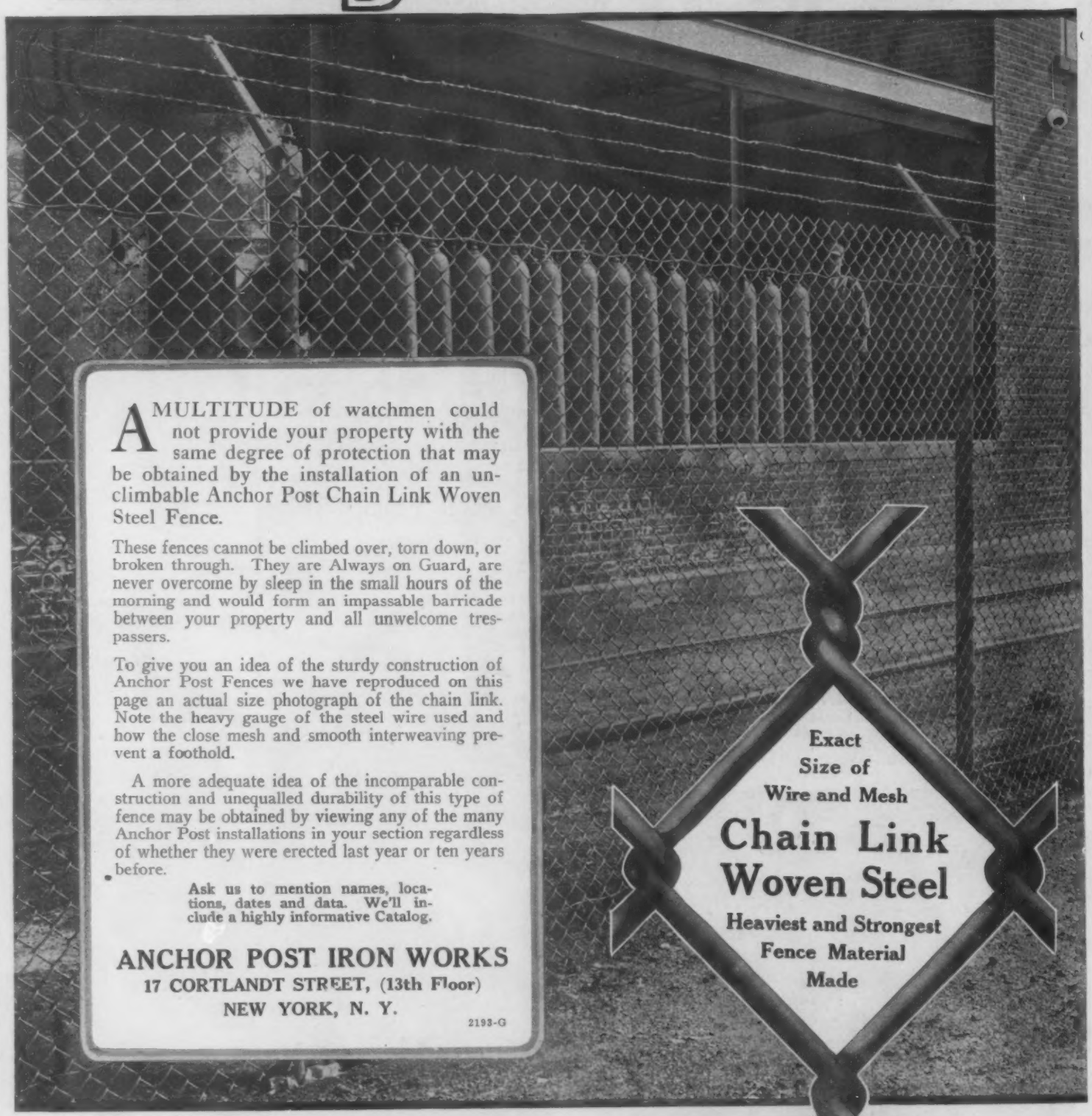
Makers of the Celebrated Goodrich Automobile Tires
—*"Best in the Long Run"*

AKRON, OHIO—The City of Goodrich



Market-bound in the Southland

Always on Guard



A MULTITUDE of watchmen could not provide your property with the same degree of protection that may be obtained by the installation of an unclimbable Anchor Post Chain Link Woven Steel Fence.

These fences cannot be climbed over, torn down, or broken through. They are Always on Guard, are never overcome by sleep in the small hours of the morning and would form an impassable barricade between your property and all unwelcome trespassers.

To give you an idea of the sturdy construction of Anchor Post Fences we have reproduced on this page an actual size photograph of the chain link. Note the heavy gauge of the steel wire used and how the close mesh and smooth interweaving prevent a foothold.

A more adequate idea of the incomparable construction and unequalled durability of this type of fence may be obtained by viewing any of the many Anchor Post installations in your section regardless of whether they were erected last year or ten years before.

Ask us to mention names, locations, dates and data. We'll include a highly informative Catalog.

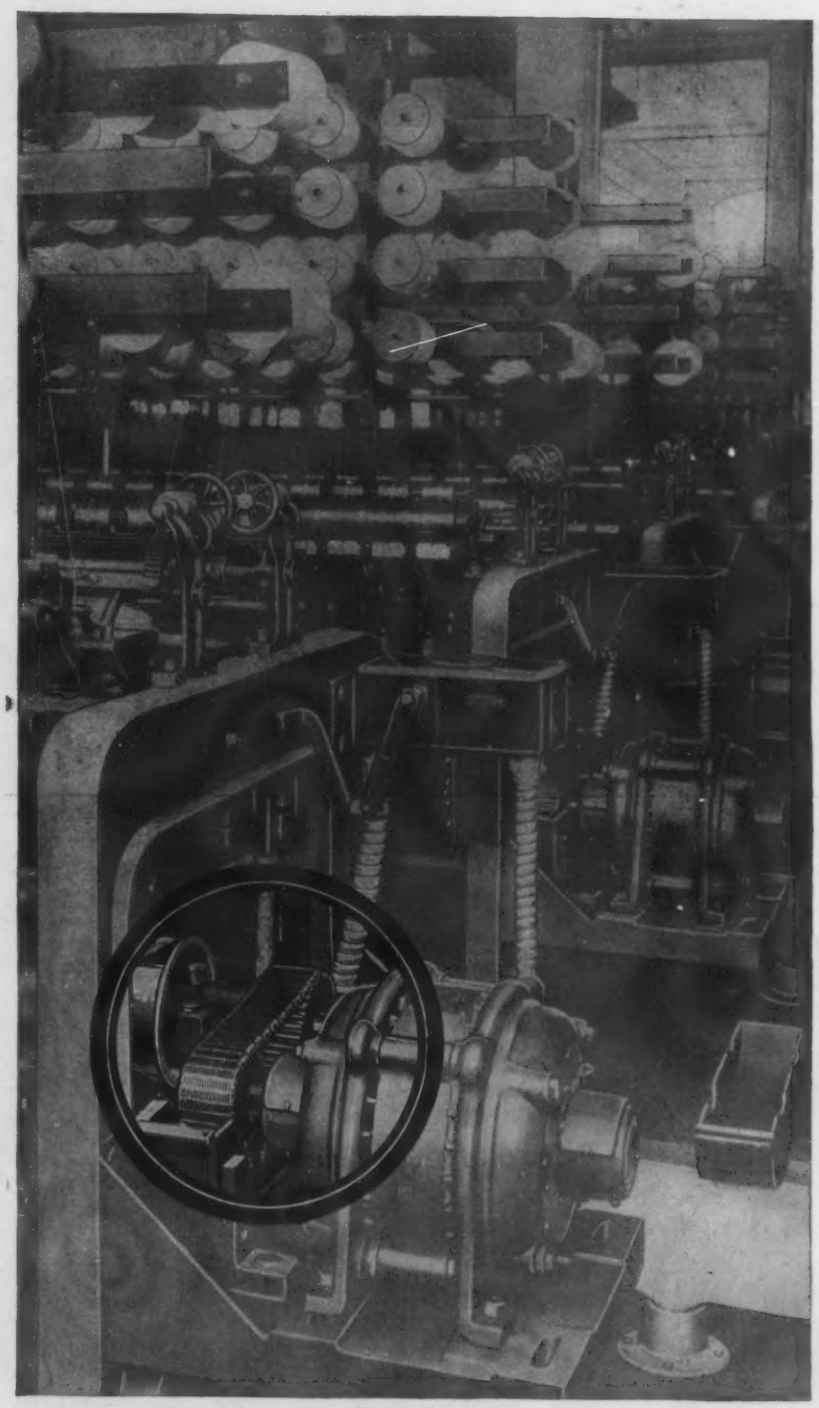
ANCHOR POST IRON WORKS
17 CORTLANDT STREET, (13th Floor)
NEW YORK, N. Y.

2193-G

Anchor Post Fences

Good business bids you investigate

MORSE
Silent Chain Drive



Twister Frames

The Drive
You Saw at
the Greenville
Exposition
Operating

FOSTER CONE WINDERS

MASON SPINNING FRAMES

WHITIN SPINNING FRAMES AND COMBERS

The Drive Which Does Not Require An Oil Bath

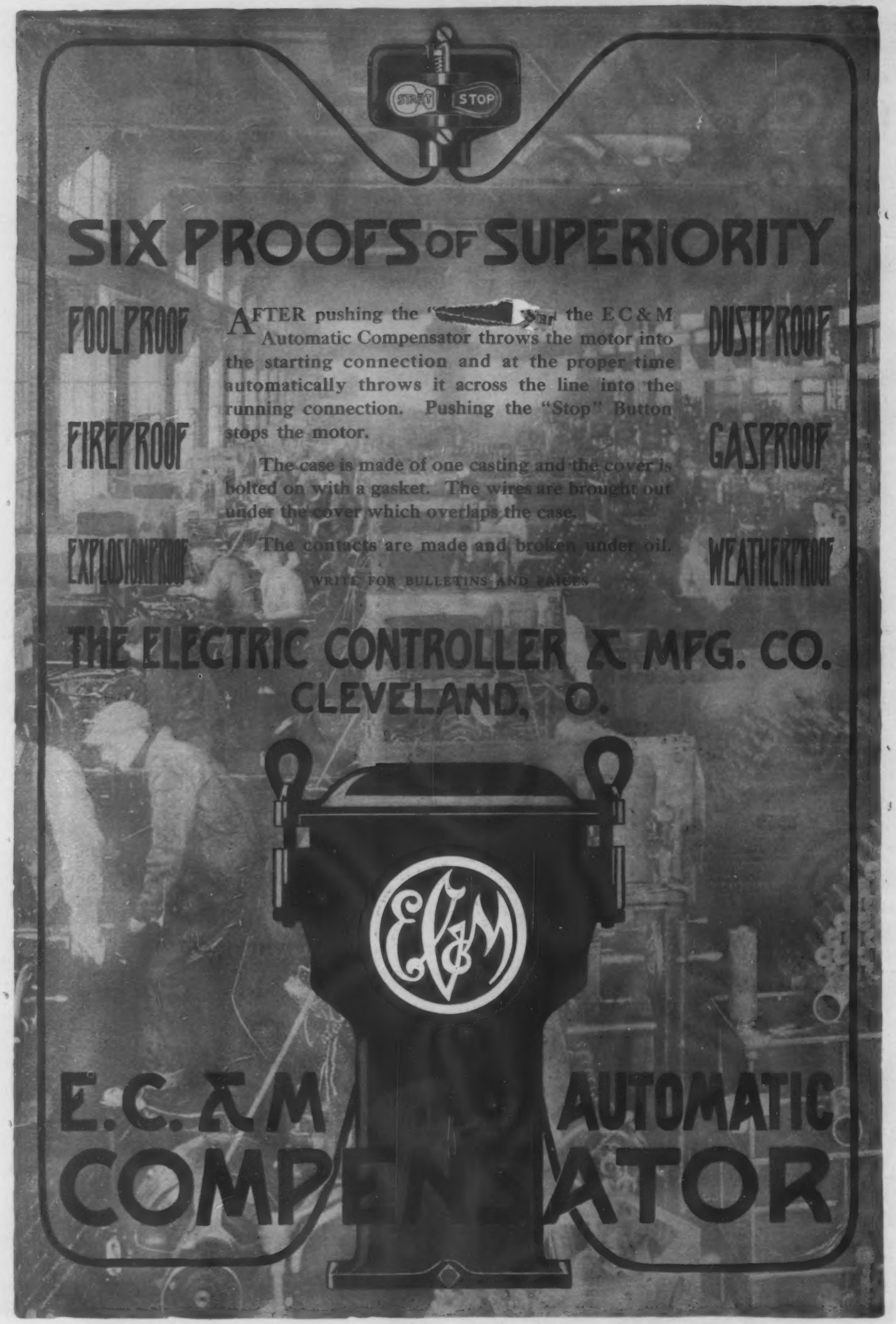
A line to either of the addresses below will bring you detailed information regarding the most successful of Textile Drives.

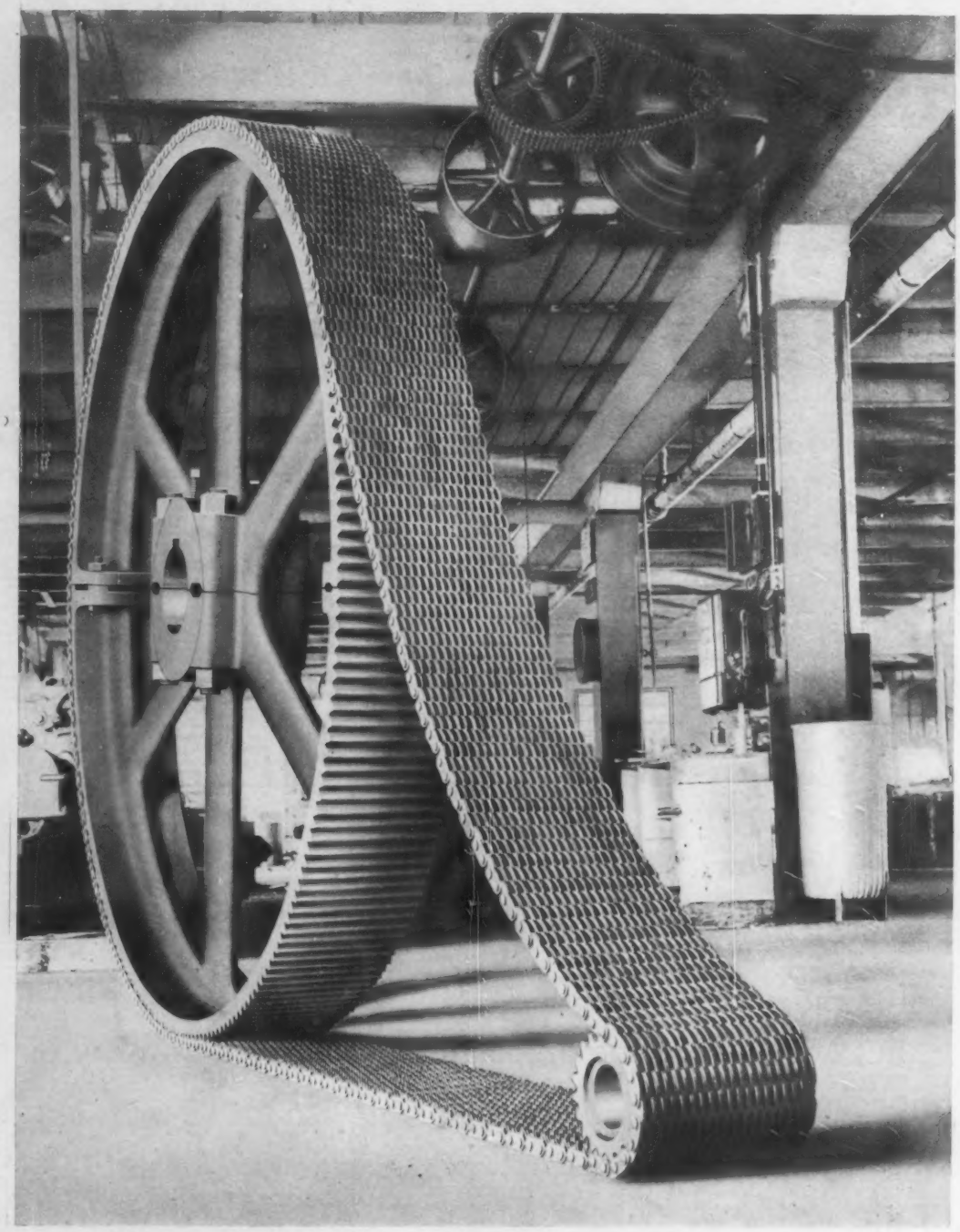
MORSE CHAIN CO.
ITHACA, N. Y.

New England Sales Offices, 141 Milk St., Boston
J. S. White, Mgr.

South Eastern Representative,
Geo. W. Pritchett, Greensboro, N. C.

Send for a copy of Our 1918 Diary


START
STOP
SIX PROOFS OF SUPERIORITY
FOOLPROOF
FIREPROOF
EXPLOSIONPROOF
DUSTPROOF
GASPROOF
WEATHERPROOF
AFTER pushing the "Start" the E C & M Automatic Compensator throws the motor into the starting connection and at the proper time automatically throws it across the line into the running connection. Pushing the "Stop" Button stops the motor.
The case is made of one casting and the cover is bolted on with a gasket. The wires are brought out under the cover which overlaps the case.
The contacts are made and broken under oil.
WRITE FOR BULLETINS AND PRICES
THE ELECTRIC CONTROLLER & MFG. CO.
CLEVELAND, O.
E. C. & M
AUTOMATIC
COMPENSATOR



SUCCESSFUL CHAIN DRIVES

WHEN A PRODUCT HAS BEEN PUT INTO SERVICE AND HAS MADE A RECORD CONSISTING OF MANY HUNDRED PERFORMANCES THROUGH A PERIOD OF SEVERAL YEARS, THE QUESTION AS TO WHETHER OR NOT IT IS A DEPENDABLE AND ECONOMICAL PRODUCT IS NO LONGER OPEN TO ARGUMENT. AMERICAN HIGH SPEED CHAIN CAN OFFER SUCH A RECORD IN EVIDENCE AND INVITES YOUR CAREFUL INVESTIGATION.

AMERICAN HIGH SPEED CHAIN

ABELL-HOWE COMPANY

National Distributor

CHICAGO

NEW YORK—BOSTON—PITTSBURGH—CLEVELAND—DETROIT—INDIANAPOLIS

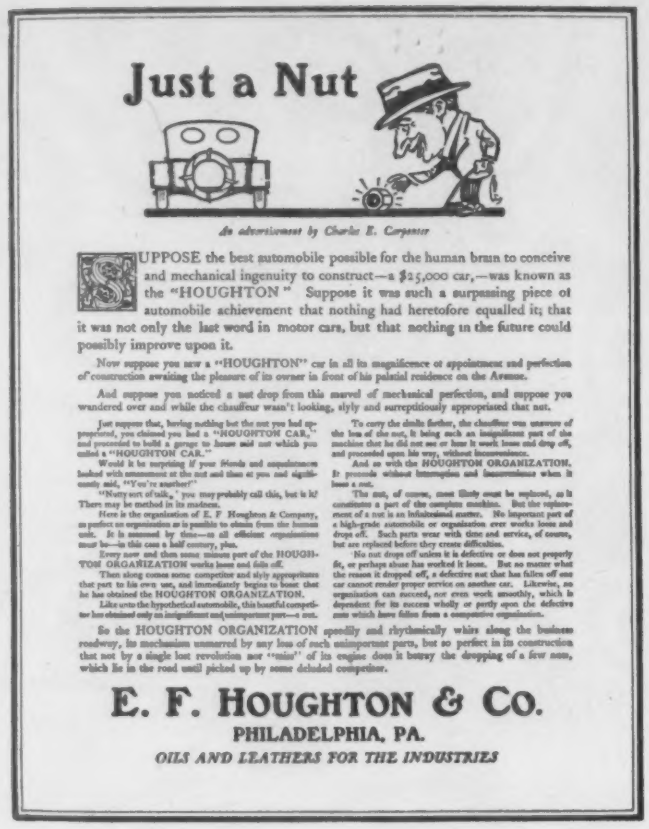
Houghton Sets the Standard

A BRIGHT chap, employed by one of the multi-millionaire imitators of HOUGHTON products, applied to us for a position, and in reply to our query as to what he had been doing, he replied, "I am the head of the HOUGHTON products department."

"You don't mean to say that your concern, our competitor, actually calls a department in their business 'HOUGHTON products department?' our President replied with a gasp of astonishment.

"That is not the authorized title, of course, but everyone at the office and works refers to it by that title," was the applicant's reply.

We present this fact as evidence of how the trade regards HOUGHTON QUALITY.


Just a Nut
An advertisement by Charles E. Carpenter
SUPPOSE the best automobile possible for the human brain to conceive and mechanical ingenuity to construct—a $25,000 car,—was known as the "HOUGHTON" Suppose it was such a surpassing piece of automobile achievement that nothing had heretofore equalled it; that it was not only the last word in motor cars, but that nothing in the future could possibly improve upon it.
Now suppose you saw a "HOUGHTON" car in all its magnificence of appointment and perfection of construction awaiting the pleasure of its owner in front of his palatial residence on the Avenue.
And suppose you noticed a nut drop from this marvel of mechanical perfection, and suppose you wandered over and while the chauffeur wasn't looking, slyly and surreptitiously appropriated that nut.
Just suppose that, having nothing but the nut you had appropriated, you claimed you had a "HOUGHTON CAR," and proceeded to build a garage to house said nut which you called a "HOUGHTON CAR."
Would it be surprising if your friends and acquaintances looked with amazement at the nut and then at you and significantly said, "You're another!"
"Nutty sort of talk," you may probably call this, but is it? There may be method in its madness.
Here is the organization of E. F. Houghton & Company, as perfect an organization as is possible to obtain from the human unit. It is measured by time—an all efficient organization must be—in this case a half century, plus.
Every now and then some minute part of the HOUGHTON ORGANIZATION works loose and falls off.
Then along comes some competitor and slyly appropriates that part to his own use, and immediately begins to boast that he has obtained the HOUGHTON ORGANIZATION.
Like unto the hypothetical automobile, this boastful competitor has obtained only an insignificant and unimportant part—a nut.
To carry the simile further, the chauffeur was unaware of the loss of the nut, it being such an insignificant part of the machine that he did not see or hear it work loose and drop off, and proceeded upon his way, without inconvenience.
And so with the HOUGHTON ORGANIZATION. It proceeds without interruption and inconvenience when it loses a nut.
The nut, of course, must likely must be replaced, as it constitutes a part of the complete machine. But the replacement of a nut is an infinitesimal matter. No important part of a high-grade automobile or organization ever works loose and drops off. Such parts wear with time and service, of course, but are replaced before they create difficulties.
No nut drops off unless it is defective or does not properly fit, or perhaps abuse has worked it loose. But no matter what the reason it dropped off, a defective nut that has fallen off one car cannot render proper service on another car. Likewise, no organization can succeed, nor even work smoothly, which is dependent for its success wholly or partly upon the defective parts which have fallen from a competitive organization.
So the HOUGHTON ORGANIZATION speedily and rhythmically whirs along the business roadway, its mechanism unmarred by any loss of such unimportant parts, but so perfect in its construction that not by a single lost revolution nor "miss" of its engine does it betray the dropping of a few nuts, which lie in the road until picked up by some deluded competitor.
E. F. HOUGHTON & CO.
PHILADELPHIA, PA.
OILS AND LEATHERS FOR THE INDUSTRIES

SINCE 1865

E. F. HOUGHTON & CO.

Publishers of The HOUGHTON LINE

Third and Somerset Sts. - - - Philadelphia, U. S. A.

NEW YORK	SYRACUSE	ATLANTA	CLEVELAND	CHICAGO	BOSTON
BUFFALO	PITTSBURGH	CINCINNATI	DETROIT	HARTFORD	ST. LOUIS

England, Ireland and Wales: Edgar Vaughn & Co., Ltd., Birmingham, Eng.
Scotland: Jas. S. Crawford & Sons, Glasgow.

Every Manufacturer Who Uses Pulleys Should Read This

LAMB MACHINE COMPANY
Incorporated
ENGINEERS,
Manufacturers of and Dealers in
MACHINERY.

IDEAL TRADE MARK

HOQUIAM, WASH. October 13, 1916.

American Pulley Company,
42 Wissahickon Avenue,
Philadelphia, Pa.

Gentlemen:

In reference to our experience with the American Steel Split Pulley, the principal industry using pulleys in this section is saw mills and other lumber manufacturing industries. It has been a recognized fact that saw mill use is one of the hardest tests to which a pulley can be placed. Till within the past few years practically all of the pulleys in use were heavy cast iron pulleys. Some of the mills were using solid built up wood pulleys. When we began to stock American Pulleys two or three years ago, we experienced a great deal of difficulty in convincing lumber manufacturers that the lighter construction of steel would withstand the heavy duty. At first we were able to supply them for the lighter work and gradually have been able to induce manufacturers to install them in other and more severe locations.

We have adopted a policy of absolutely guaranteeing every pulley which we put into service, and are pleased to report that the failures due to inherent weakness of the pulley have been nil. In lumber manufacturing the service is to a very large extent intermittent and our experience with motor drives has shown us that the horsepower consumed on certain machines at certain times is many times the normal horsepower load. It is such service as this that sometimes wreck any type of pulley. We refer, however, to one pulley in particular with a 12" face-driving a heavy planer-which replaced a cast iron pulley and which we were compelled to guarantee for one year. The pulley has stood up to the work perfectly and shows no sign of failure. The American is so entirely satisfactory that we feel absolutely safe in guaranteeing their performance in any position in which a pulley should be placed.

Yours very truly,
LAMB MACHINE COMPANY
President.

AMERICAN STEEL SPLIT PULLEYS

The above letter is eloquent testimony of the great strength and durability of American Steel Split Pulleys.

They are guaranteed to perform double belt duty under all conditions not demanding a special pulley.

They transmit maximum power with minimum belt slip.

They will stand up under greater strains than other pulleys having much more weight.

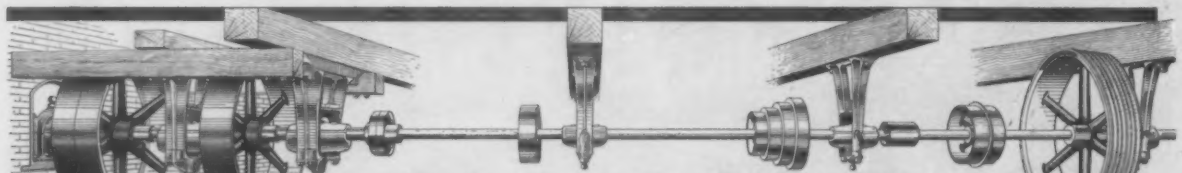
They reduce pulley power losses to a minimum and are the most efficient and economical pulleys you can buy.

Over two hundred and fifty dealers in different parts of the United States carry large stocks of American Steel Split Pulleys. Write for the name of the nearest dealer, and for the Free Book, "Pulley Efficiency"—a valuable treatise on pulleys.

The American Pulley Company

4200-60 Wissahickon Avenue, Philadelphia, Pa.

New York: 33-35 Greene Street
Chicago: 114-116 South Clinton Street
Boston: 165 Pearl Street
Seattle: 536 First Ave. South
San Francisco: 14 Natoma Street



CRESSON-MORRIS CO.

POWER TRANSMITTING MACHINERY

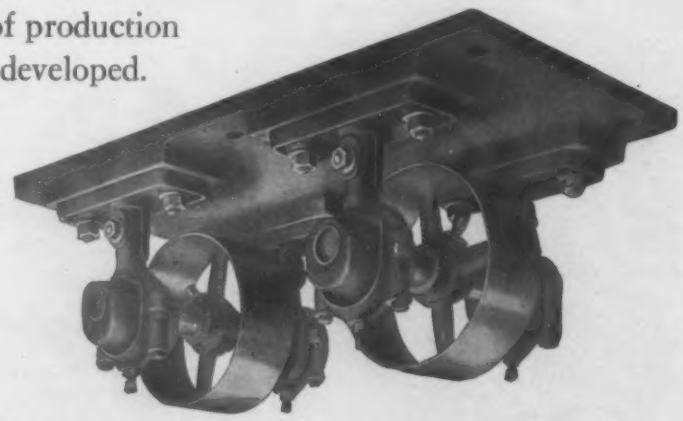
Production

PRODUCTION logically falls into two general classes—quantity production and quality production. Quality machinery is essential to both.

Thousands of manufacturers have been helped to attain greater output and higher quality through the use of power transmitting machinery bearing the finished perfection mark of the Cresson-Morris Company.

The Cresson-Morris mark is a fifty-eight year testimonial that Cresson-Morris Machinery has successfully overcome the fifty-seven varieties of conditions that the pushing up of production and the pushing down of costs has developed.

Pulleys, Hangers, Pillow Blocks, Shafting, Gears.



It is the business of the Cresson-Morris staff of engineers to anticipate and meet the conditions that may arise tomorrow. They are always at your service.

CRESSON-MORRIS COMPANY

Engineers—Founders—Machinists

PHILADELPHIA - - - - - PENNA.

2066-X

ARCO-RAYS—

A Development of 38 Years' Experience

For thirty-eight years we have made products that stood the test of severe specifications, and in the accumulation of knowledge and experience gained in supplying paints to large and small manufacturers, we first noticed the need, then the demand, and later the absolute necessity for a white interior coating for factory workrooms.

Desired results in such a product, that would be thoroughly efficient, could not be secured in a day—a week—or a year. It would take time—and it did take time, but now we have the product—

ARCO-RAYS

"LENGTHENS YOUR DAYS"

TRADE MARK, REG. U.S. PAT. OFF

Stays White and Stays On

Now—today—every factory in the United States can secure a brush-applied white coating that required over a quarter of a century to perfect, that is an asset to many industrial plants.

Arco-Rays is applied with a brush—any man can do it—easily. Once on your walls, ceilings and columns—it *stays on* and *stays white*. In laboratory and factory we have made it impossible for Arco-Rays to chip, flake or crack.

In addition it will at all times thoroughly diffuse 80% of all light—natural or from lamps.

Think what this means in your workrooms—dark spaces are transformed into light, cheerful, valuable, productive areas. Eye strain, caused by lack of light, is immediately made a thing of the past. Accidents, the result, as a rule, of improper lighting, are materially reduced, as are waste, spoilage and destruction of tools and materials.

These are a few of the benefits that manufacturers can secure with Arco-Rays. Other numerous advantages will be obtained, different in many instances, as conditions differ, but in every factory, the results of applying Arco-Rays will multiply, one thing succeeding another to the betterment of an organization, and all, for the general good and improvement of men, machines, merchandise and all around efficiency.

Our new book, is the evidence of thirty-eight years in the making of products that are serving and will continue to serve American industries, in their goal for bigger, better production,—its title is "Factory Lighting and Its Relation to Efficiency." Send for your copy.

THE ARCO COMPANY

General Offices, 121 Wise Building, Factory and Laboratories, 79th St. and Bessemer Avenue, Cleveland, Ohio

Sales Offices: Kansas City, Gloyd Bldg., Philadelphia, Otis Bldg., New York City, 514 W. 36th Street

MAKERS OF HIGH GRADE PAINTS, VARNISHES AND ENAMELS

Established 1880

ARCO-RAYS

"LENGTHENS YOUR DAYS"

TRADE MARK, REG. U.S. PAT. OFF.

D. M. Dillon Steam Boiler Works

SPECIALTIES

*Horizontal Return Tubular Boilers

*Manning and Plain Upright Boilers

*Scotch Marine Type Boilers

*Locomotive Boilers

Rotary Bleaching Kiers

Upright Bleaching Kiers

Steel Tanks of All Kinds

Smoke Stacks and Flues

Heavy Steel Plate Work

Patent Shaking Grates

*All boilers built according to **Massachusetts** and **A. S. M. E.** Standards.

ANNUAL CAPACITY 100,000 BOILER HORSE POWER

Works at

FITCHBURG, MASS.

NEW YORK OFFICE
30 CHURCH STREET

Southern Representative
J. S. COTHRAN
CHARLOTTE, N. C.

Established 1870
Incorporated 1906

SCHIEREN BELTINGS

1868

Fiftieth Anniversary

1918

The changes wrought in 50 years of time have given to New York a distinctive individuality in its numerous skyscrapers, its mammoth bridges and its subways, and made it, in more ways than one, the most important city in the world today.

New York has always been the home of the Chas. A. Schieren Company, makers of superior leather beltings.

50 Years

THE story of the growth of the Chas. A. Schieren Company is simple.

The beginning, in 1868, antedates electric light, electric cars, automobiles, the telephone, the famous Brooklyn Bridge, the subways, and many other wonders which are now commonplace.

With but two employees to assist him, Chas. A. Schieren laid well the foundation for the present organization. He made the very best leather belts he knew how, sold them at a reasonable price, and treated his customers in a broad-minded liberal manner. Customer satisfaction was the primary objective, all else secondary.

Such a policy, strictly adhered to year after year, rapidly made friends and customers and Schieren Beltings were soon favorably known and in demand the world over.

Expansion early became necessary and the factory was moved from 90 Gold Street to 72 Cliff Street in 1881, and the lace leather tannery was established in Brooklyn, New York, just across the river from the main factory, shortly afterward.

Still larger quarters were found necessary in 1884 and the factory was again moved, this time just across the street, to 74-76 Cliff Street.

Realizing the importance of proper tannage of leather for power belts, the Dixie Tannery was built in 1893, and from that date, every step in the making of Schieren Beltings has been in the hands of skilled Schieren workmen, the tanning being done by the old-fashioned long-time pure oak bark process, which is still superior to all other methods of tanning leather for beltings.

Space does not here permit showing views of the buildings occupied between 1881 and 1905, but it may be interesting to know that one was located on the southeast and the other on the northeast corners of Cliff and Ferry Streets, and that, in 1905, when another move was necessary, it was to the specially designed Schieren Building built upon the southwest corner of the same streets, and but a stone's throw from the original location in 1868.

The solid foundation for growth and success laid down by the founder in 1868, and the principles of business instituted and strictly adhered to by him, today form the basis of the policies of the Schieren organization.

Departments have been added from time to time, original ideas have been enlarged upon and improved, the product has been bettered through greater experience and refinements in manufacture, and today SCHIEREN Beltings are known for the excellent service they give, and the company, for the business influence it wields, the world over.

s of Progress

THE pictures on these two pages are arranged to give you a panoramic idea of the growth of the Chas. A. Schieren Company.

Fig. (1) represents the building at 90 Gold Street, New York, where, in 1868, Chas. A. Schieren first made leather beltings.

Fig. (2) illustrates our Dixie Tannery at Bristol, Tennessee, as completed and first operated in 1893.

Fig. (3) is a photograph of our tannery at Brooklyn, New York, where lace leather is made.

Fig. (4) shows the Dixie Tannery as it looks today, where all of the hides that enter into SCHIEREN Beltings go through the long-time pure oak bark process of tanning.

Fig. (5) shows the Schieren Building at 30-38 Ferry Street, in the very heart of downtown New York, and the present home of the factory and main offices, including the Export Department.

SUMMED up, the present world-wide distribution of SCHIEREN beltings has been made possible by:

(1) An honestly made product that stands up well in the service of the customer.

(2) A broad, liberal policy which has served to retain our customers' goodwill and patronage year after year.

(3) Continuous National and International Advertising that has put us in touch with buyers and users everywhere.

(4) Attracting to our organization, through a combination of the above, firms of the highest calibre to act as our distributors, and, through their active support, making it more convenient for customers to obtain SCHIEREN Beltings quickly when needed.

Our healthy growth and substantial success have been due to:—the product itself, liberal terms and assistance to distributors, continuous advertising, and a business policy which retains the goodwill of both customers and distributors.

We invite inquiries for detail information from buyers, users, or prospective distributors of leather beltings.

DUXBAK BELTING TRADE MARK

Chas. A. Schieren Company ESTABLISHED 1806

Tanners,
Belt Manufacturers

23 Ferry Street, NEW YORK

Branch Offices in
Boston Philadelphia Chicago
and other large cities

Oak Leather Tanneries, Bristol, Tenn.

The Switch You Have Always Wanted-

Combining

Quick Make and Quick Break

with

Overload Protection and Low-Voltage Protection

No other Switch combines so many useful features.

It can be furnished as follows :—

(1) **Non-Automatic.**

(2) **Non-Automatic with low-voltage protection.**

(3) **Full-Automatic with inverse time element and overload protection.**

(4) **Full-Automatic with inverse time element overload and low-voltage protection.**

The Switch is used for starting Squirrel Cage Motors, 25 H.P. and smaller, 220-440 and 550 volts.

Operator cannot retard the action of contacts after they have started to close. They are opened and closed in oil, and the action is so quick the eye cannot follow the motion.

The Switch is fitted with dashpot relays, which permits the amount and duration of overload to be adjusted from the outside, without opening switch.

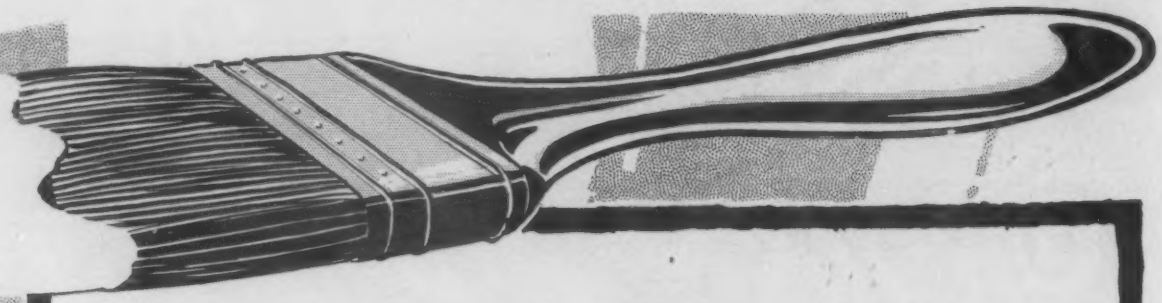
Ask for Descriptive Leaflet 1441

Westinghouse Electric & Manufacturing Co.

East Pittsburgh, Pa.

W WESTINGHOUSE ELECTRIC

Westinghouse



Lower Maintenance Cost of White Walls

Maintain your walls *white,* but *do away* with frequent *repainting.*

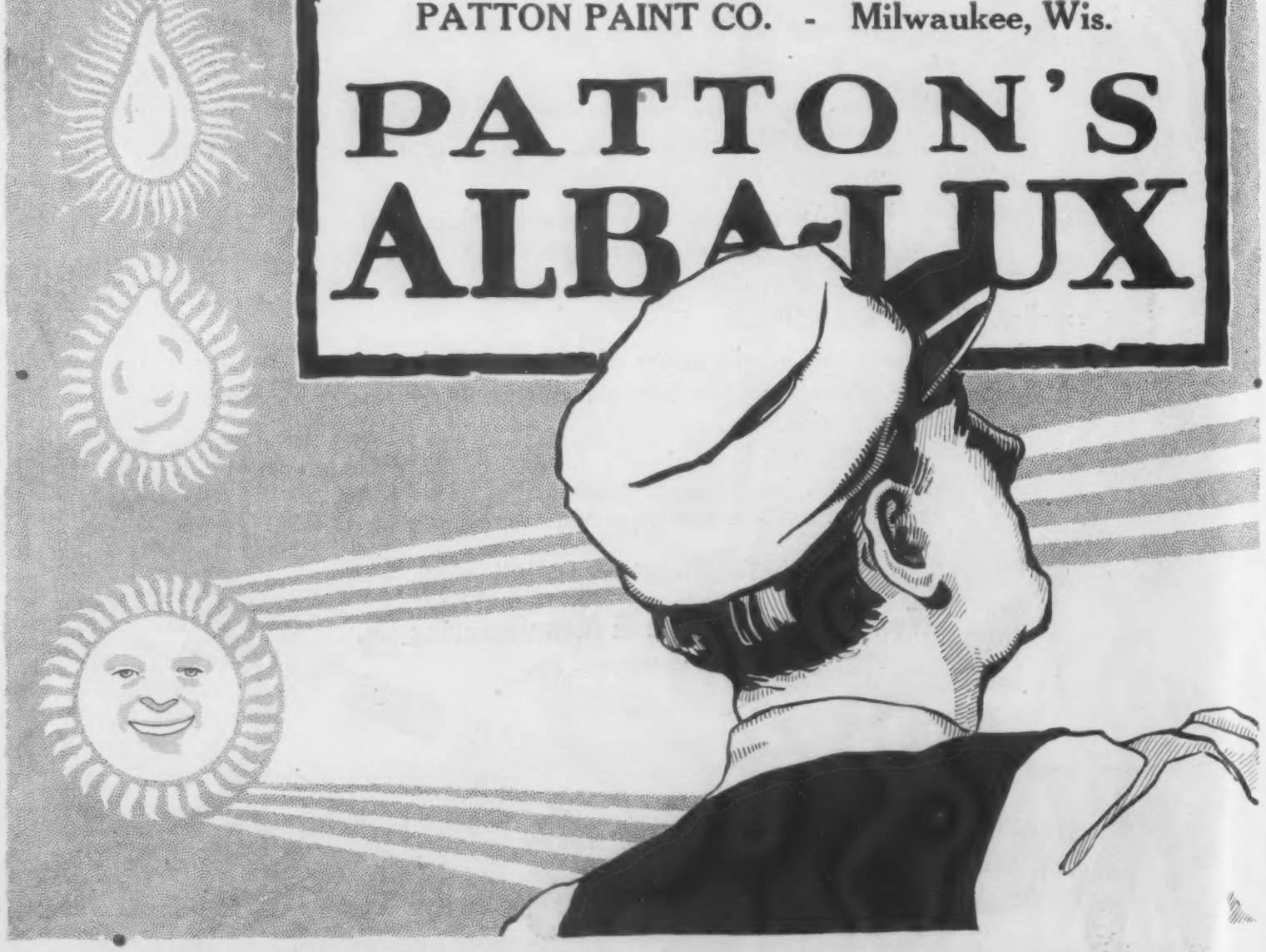
Use the industrial wall paint that is *" almost an enamel,"* and *washes* like enamel—*sheds* the dust like enamel, and *stays white.*

This enamel-like industrial wall paint—Patton's Alba-Lux is an *oil* paint. This means long *durability*—easy *washability*—the absolute lowest cost *per square yard* for *maintaining* your walls white.

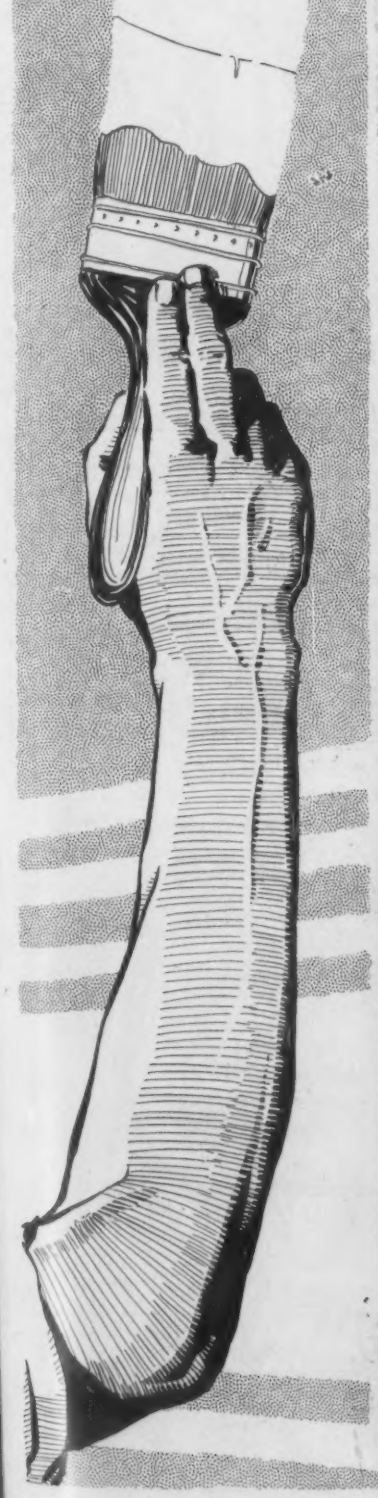
Write for free Shadowgraph—a device for demonstrating the light diffusing value of white walls. Every owner and superintendent should make this test—write for this Shadowgraph, also for booklet—" The Dividend Value of Light Diffusing Paint."

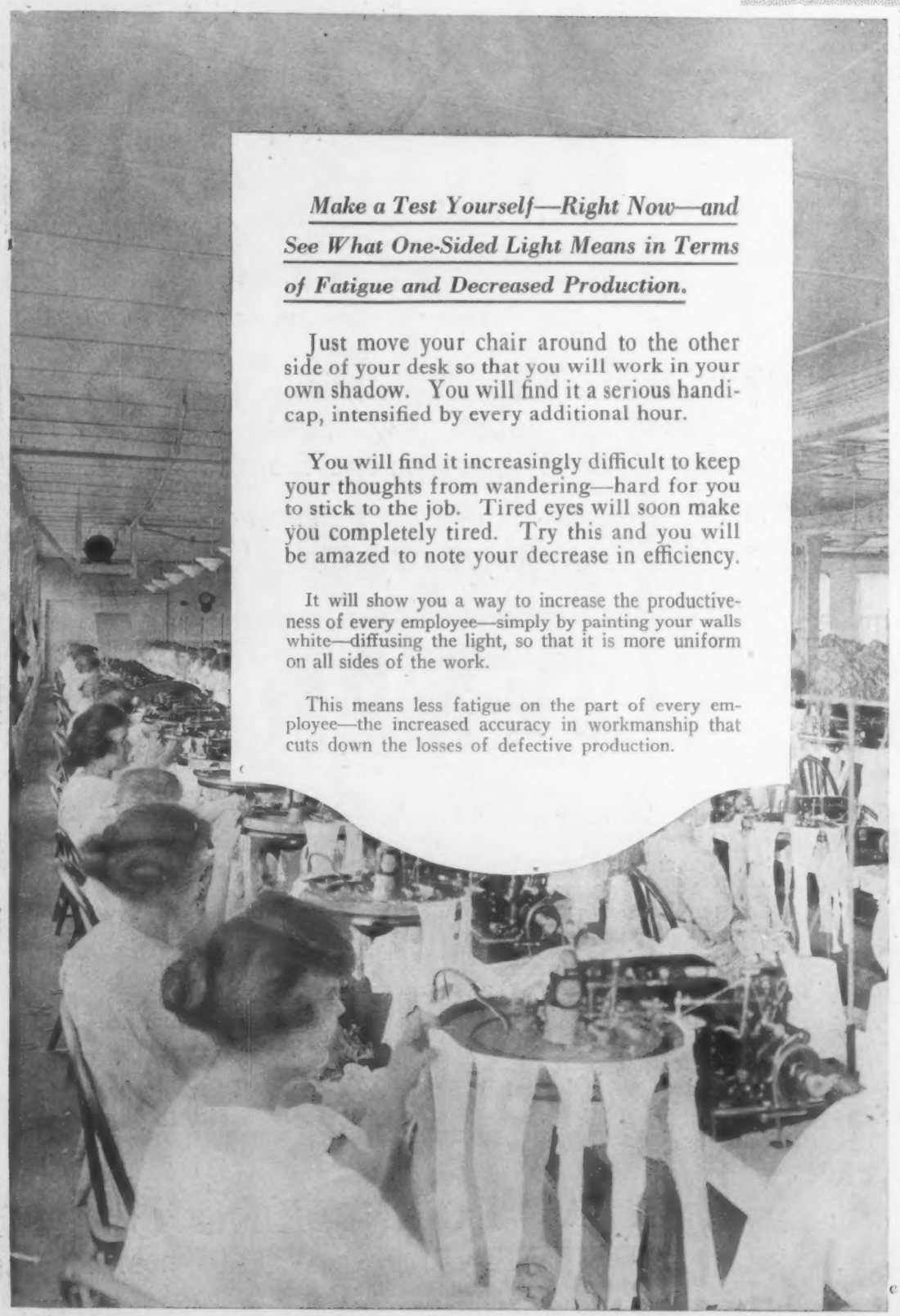
PATTON PAINT CO. - Milwaukee, Wis.

PATTON'S ALBA-LUX



Washable Walls—White as Cotton





Make a Test Yourself—Right Now—and See What One-Sided Light Means in Terms of Fatigue and Decreased Production.

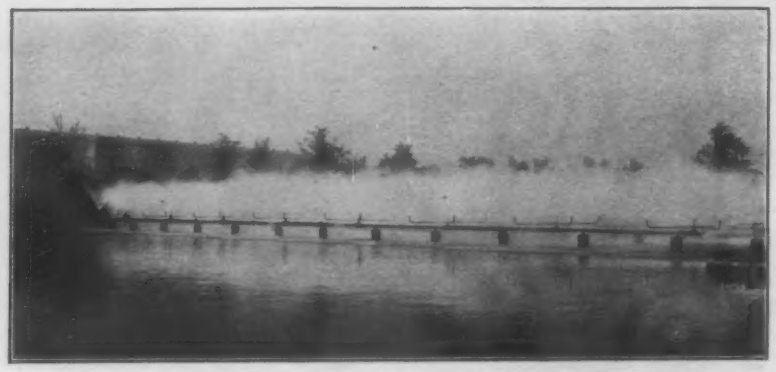
Just move your chair around to the other side of your desk so that you will work in your own shadow. You will find it a serious handicap, intensified by every additional hour.

You will find it increasingly difficult to keep your thoughts from wandering—hard for you to stick to the job. Tired eyes will soon make you completely tired. Try this and you will be amazed to note your decrease in efficiency.

It will show you a way to increase the productiveness of every employee—simply by painting your walls white—diffusing the light, so that it is more uniform on all sides of the work.

This means less fatigue on the part of every employee—the increased accuracy in workmanship that cuts down the losses of defective production.

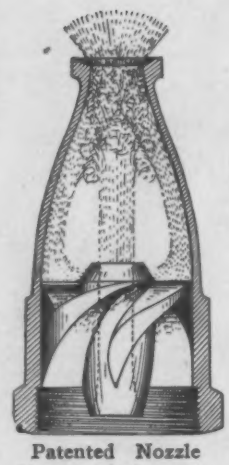
Our Record—More than 400 Successful Installations



2000 H.P. "Spraco" System, Saxony Worsted Mills, Newton, Mass.

IN these 400 odd installations, the Spraco System for Cooling Condensing Water has increased power plant efficiency from 15% to 25%.

Isn't it reasonable to suppose that such a system would increase the efficiency of *your* power plant? The conditions there are undoubtedly similar to the former conditions in many of these other plants. The



Patented Nozzle Developed for Use On Cooling Ponds

SPRACO Cooling System

carries the hot water from the condenser and *sprays* it into the cooling pond through Spraco Patented Center-Jet Nozzles. So efficient are these Nozzles, that the pressure required at that point is only 5 to 7 pounds. The maintenance cost of the entire system is insignificant.

We *guarantee* that a well constructed Spraco System will increase the cooling capacity of a natural pond 36 times—that it has a lower first cost, a lower operating cost and a lower depreciation than any good cooling tower.

Our method is to investigate and to suggest an installation only when we are sure that it will result in large savings. Why not have one of our Engineers investigate *your* plant?

Our two Booklets, "Cooling Ponds for Condensing Engines," and "Spray Cooling of Condensing Water," contain helpful information, written in clear, concise language.

We will gladly send copies to you. Write.

SPRAY ENGINEERING CO. Div 9.
93 FEDERAL STREET - - - BOSTON, MASS.

Cabot Mfg. Co.
Brunswick, Me.

Double Your Working Light

Bright walls pay dividends. They reflect daylight, save lighting bills, minimize accidents, increase production and improve the workers' health. In these days of fuel shortage, there is no better place you can save fuel and money than in the conservation of light.

White painted walls help wonderfully. White inside walls have proven their value to the Cabot Mfg. Co., Brunswick, Me., whose splendid plant is shown above. The interior walls of this big factory are made light and bright with

Lowe Brothers
MILL WHITE

A white paint that covers solid with fewest number of coats. Easily and quickly applied. Makes a most durable coating over wood, brick, concrete, steel, plaster, etc.

Dries quickly to a brilliant, live white that reflects maximum light. May be tinted to match your factory color if desired.

Write for our Mill White Booklet

It tells you why it will pay you to select Lowe Brothers Mill White to brighten your factory and save money on your lighting bills.

Tell us how many square feet of walls and ceilings you have to cover and we will quote on the minimum amount necessary for a thorough job.

The Lowe Brothers Company

484 E. Third Street, Dayton, Ohio

Boston New York Jersey City Chicago Kansas City Minneapolis Lowe Brothers, Ltd., Toronto, Can.

Why Not Make Your Waste Paper Pay Dividends?

Waste Paper today is worth at least $10 a ton for the lowest grades. It is wasteful to throw your paper away or burn it when you can just as easily bale it and thus make it a source of income. Join the ranks of users of the

COMMON SENSE BALER

In the mills where these Balers have been installed, the waste paper is deposited in receptacles and collected on a regular schedule.

This practice not only encourages neatness and system among the employes, but greatly reduces the fire risk—*a large proportion of mill fires have started in the scrap pile.*

The Common Sense Baler, as its name implies, is built for SERVICE. It is simple, strong and durable; there is nothing to get out of order—no plunger to lift out, no door to take off, no tamper necessary. Any boy can operate it.

These Balers are made in four sizes, ranging in price from $16 to $22, turning out bales of 75 pounds to 160 pounds. Every Common Sense Baler is

guaranteed for one year

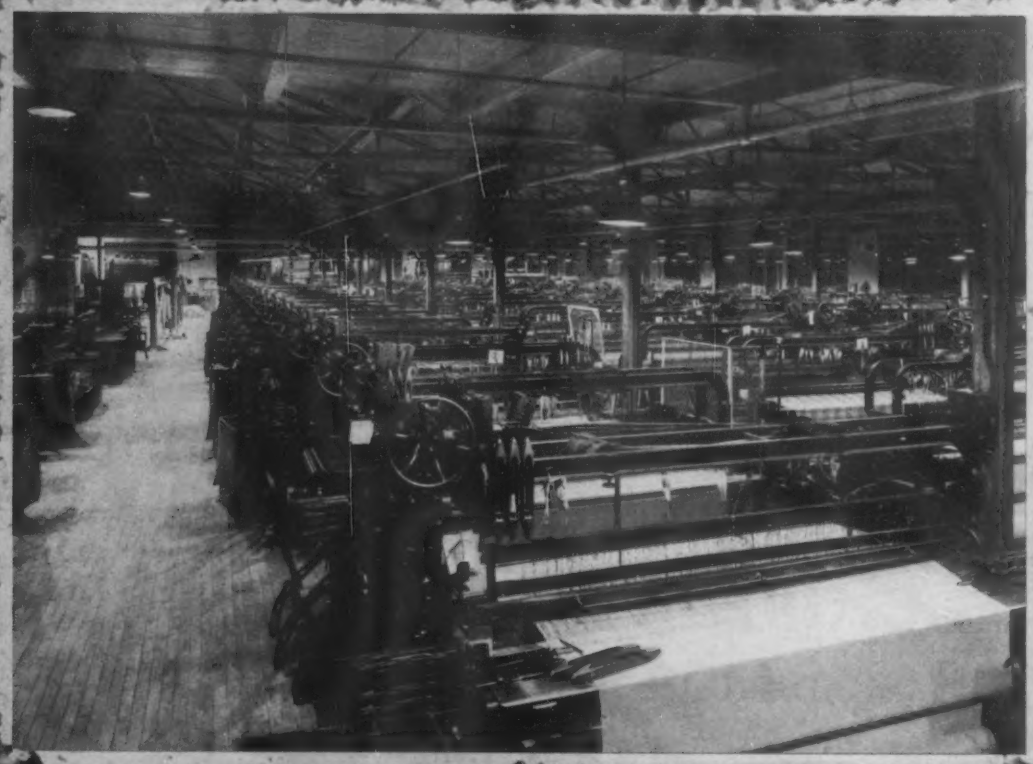
Write for further information now and open up this new source of revenue.

Orders for textile wrapping papers of every description solicited.

Sylvester S. Garrett & Co.

259 South Third Street, Philadelphia, Pa.

Every thread plain



X-Ray Lighting
from Concealed Sources

NATIONAL X-RAY REFLECTOR CO.

226 W. JACKSON BLVD
CHICAGO.

31 D. WEST 46TH ST.
NEW YORK

Mossberg Steel Warp Beam Heads Will Protect You Against This→

Beam Heads that break represent an unnecessary expense. Why not turn this expense into *investment* by ordering Mossberg Pressed Steel Heads? Mossbergs are unbreakable and will outlast any number of cast iron heads.

Furthermore, warp beams equipped with Mossberg's steel heads are about *39% lighter* than similar beams with cast iron heads and can be shipped third-class freight. Beams with cast iron heads must be shipped second-class freight.

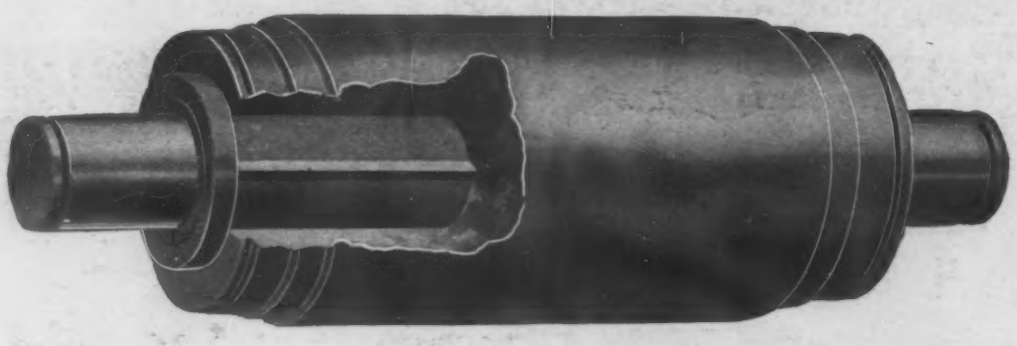
The saving in freight rates + The saving in weight } = { A saving of about 46% of your freight bills.

Frank Mossberg Company
Attleboro, Mass.

Perkins Guaranteed Rolls or Bowls

Have Unique Advantages Distinguishing Them From the Ordinary Rolls or Bowls

The line includes Cotton Rolls, Paper Rolls, Husk Rolls, and Combination Cotton and Husk Rolls



For Calenders, Mangles, Schreiner Machines, and General Finishing Work

Your Old Rolls can be refilled so as to gain these special advantages.

Let us tell you what you would gain by using our rolls and who are some of the well-known Finishers already receiving these benefits.

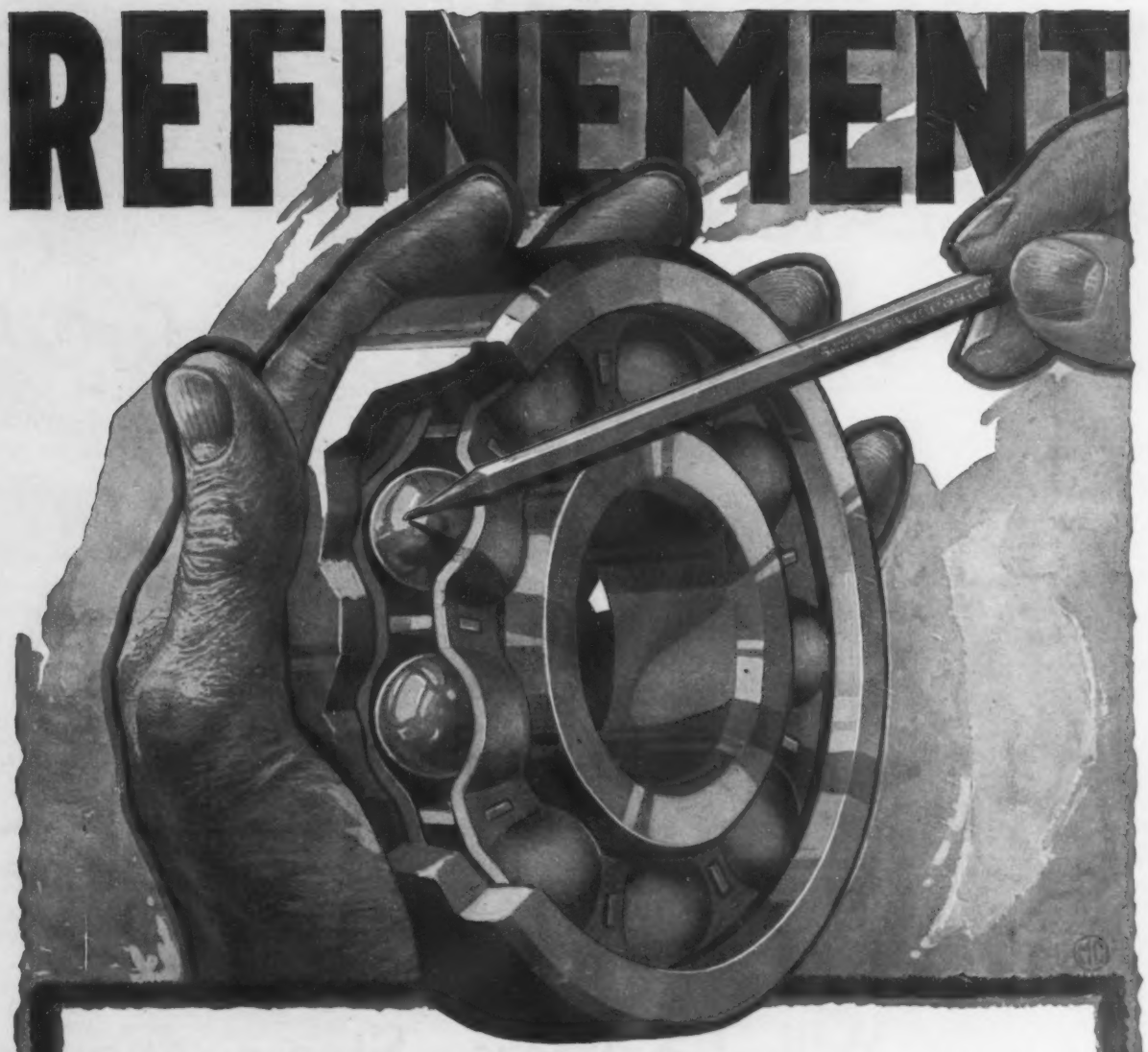
Every Perkins Roll is guaranteed first-class in every respect.

B. F. PERKINS & SON, Inc.

Calender Roll Department

22 Crescent Street **HOLYOKE, MASS.**

REFINEMENT



THE quality refinements of New Departure Ball Bearings are years in advance of most American products.

Added to American genius for achievement, New Departure methods have sensed the advantages of profound study of detail.

New Departure Ball Bearings are rich in accumulated betterments.

Among the improvements which make the New Departure a superior bearing are—exclusive heat treating and manufacturing processes, exceptionally resilient chrome alloy steel, deep raceways, maximum size and number of balls and an exquisite accuracy of finish.

Add to these qualities prompt deliveries and New Departure service, and you have every reason why your choice should be New Departure Ball Bearings.

THE NEW DEPARTURE MFG. COMPANY, Bristol, Conn.

294

NEW DEPARTURE BALL BEARINGS

Conrad Patent Licensee

Substitute

CHAPMAN BALL BEARINGS

in Your Hangers and *Watch Production Costs Drop*

Chapman Ball Bearings will fit your hanger frames —they are constructed to fit any of the standard hangers in the market. Therefore, it is unnecessary for you to re-equip your plant with new hangers in order to gain the advantages of the Chapman Bearing. We just want you to substitute Chapman Ball Bearings in the hangers you are now using and then watch power costs come down. And remember this, there are no losses from stained goods because no oil is used on Chapman Bearings. Your machines, too, will run steadier—a factor which tends to improve the quality of your product. The Chapman Ball Bearing requires lubrication about twice a year—no other attention is necessary.

We believe that with our 14 years' experience in the designing and manufacture of ball bearings, we may be of some assistance to you in reducing your production costs. If we can, we will be glad to do it.

TRANSMISSION BALL BEARING COMPANY, Inc.
1050 Military Road, BUFFALO, N. Y.

NEW YORK: Room 101, 30 Church St. *Branch Offices:* PHILADELPHIA: Bourse Building
CHAPMAN DOUBLE BALL BEARING CO., Ltd., 339-351 Sorauren Ave., TORONTO, ONT.

District Offices

Atlanta, Ga.
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New York, N. Y.
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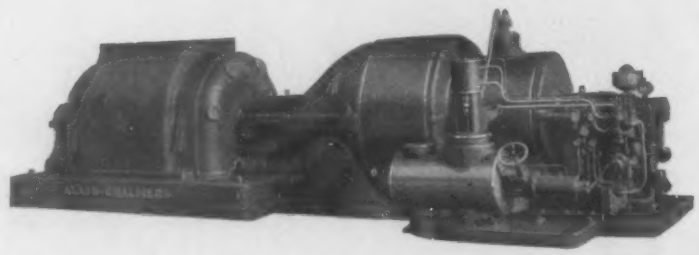
St. Louis, Mo.
Salt Lake City, Utah.
San Francisco, Calif.
Santiago, Chile, So. America.
Seattle, Wash.
Toledo, Ohio.

EFFICIENCY—RELIABILITY—SIMPLICITY

Allis-Chalmers Steam Turbines

Show sustained economy after years of operation
Units built in sizes from 200 K.W. up



3750 K.W. Max. 1800 R.P.M. 80% P. F. High Pressure Steam Turbine and Alternator.
Two units of this size furnished Nashewena Mills, New Bedford, Mass.

Allis-Chalmers Manufacturing Co.

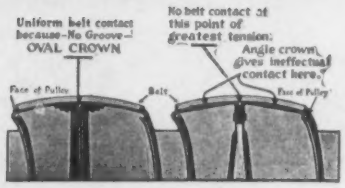
Milwaukee, Wis.

For all Canadian Business refer to Canadian Allis-Chalmers, Ltd., Toronto, Ont., Canada

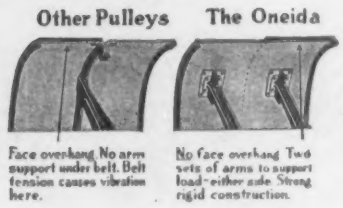
ONEIDA

DODGE

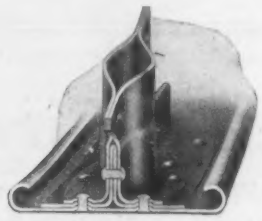
Oneida Steel Pulleys


Uniform belt contact because—No Groove—OVAL CROWN
No belt contact at this point of greatest tension.
Angle crown gives ineffectual contact here.
Face of Pulley
Belt
Face of Pulley

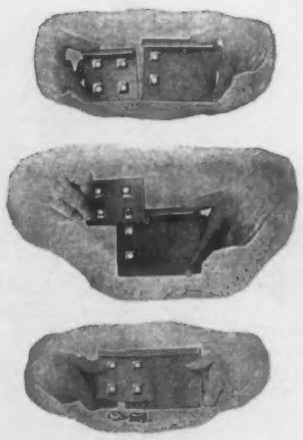
Note how the *uniform* OVAL CROWN of the ONEIDA pulley face conforms to the natural curve of the belt—giving maximum area of effective belt contact. Only by friction of *actual contact* between belt and pulley-face can power be transmitted. Maximum belt contact permits lower belt tension, lower bearing friction and lower power costs.


Other Pulleys
The Oneida
Face overhang. No arm support under belt. Belt tension causes vibration here.
No face overhang. Two sets of arms to support load—either side. Strong rigid construction.

Two sets of arms in the ONEIDA beginning at 8″ face in the smaller sizes (as against 18″ face in other makes) prevents distortion and failure, which the wide-face, single-arm pulley invites, especially where shifting belts are used.



At Left: All metals taking rivets in the ONEIDA are countersunk neatly, male and female. Thus the rivets are relieved of all lateral strain, and cannot shear.



At Left: The two halves of the ONEIDA rim are connected rigidly by *interlocking* beaded rim plates, countersunk (for bolts) to match the countersink of the rim. In the larger sizes auxiliary arm support is provided to further strengthen the rim at the parting. ONEIDA pulley rims are dependable.

Dodge Sales and Engineering Company

MISHAWAKA, INDIANA, U. S. A.

Distributor of the Products of DODGE MANUFACTURING COMPANY *and* DODGE STEEL PULLEY CORPORATION

BRANCH OFFICES AND WAREHOUSE STOCKS:

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INDIANAPOLIS Merchants Bank Building	PHILADELPHIA 815 Arch Street	UTICA, N. Y. 211 John Street	CHICAGO 208 South Clinton Street	MINNEAPOLIS 100 North Third Street
PITTSBURGH 337 Second Avenue	CINCINNATI 128 West Third Street	NEWARK 59 Mechanic Street	PROVIDENCE, R. I. 1[illegible] Pine Street	SEATTLE, WASH. 522 First Avenue, South

• DEALERS EVERYWHERE

CRANETILT STEAM TRAPS

solve condensation problems.

No. 90 Direct Return Steam Trap

is the most efficient device on the market for delivering feed water to a boiler.

No. 30 Non-Return Steam Trap

is the most economical, simple and practical device that can be used for automatically removing condensation without loss to the steam at any temperature or pressure.

No. 100 Three Valve Lifting Trap

is especially adapted for use on return lines handling condensation under varying pressures.

MALLEABLE IRON TANKS —— EASILY RENEWABLE VALVES AND SEATS —— NO INSIDE WORKING PARTS

Sales Offices, Warehouses and Showrooms:

Boston, Springfield, Bridgeport, New York, Brooklyn, Philadelphia, Newark, Camden, Baltimore, Washington, Buffalo, Savannah, Atlanta, Knoxville, Birmingham, Memphis, Little Rock, Muskogee, Oklahoma City, Wichita, St. Louis, Kansas City, Terre Haute, Cincinnati, Indianapolis, Detroit, Chicago

FOUNDED BY R. T. CRANE, 1866

CRANE CO.

836 S. MICHIGAN AVE.

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Grand Rapids, Davenport, Des Moines, Omaha, Sioux City, St. Paul, Minneapolis, Duluth, Fargo, Watertown, Aberdeen, Great Falls, Spokane, Seattle, Tacoma, Portland, (O.), Pocatello, Salt Lake City, Ogden, Sacramento, Oakland, San Francisco, Los Angeles, Winnipeg, Vancouver

Works: Chicago and Bridgeport

Reduce Accident and Fire Hazards

A few of the many Safety First and Lint-Proof Condulets that make Electrical Installations Safe

To-day is the best time to write for complete literature. ∴ Sent Free upon request.

Type VL, Weather and Lint-Proof Condulet

Type A, Obround Condulet Body with 2-wire Hole Porcelain Cover

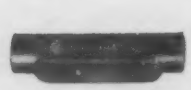
Type ZYU, Fused Safety First Switch Condulet Body

Type FS, Condulet Body with Lint-Proof Cover for Operating Flush Push Button Switches

Type VS, Weather and Dust-Proof Hand Lamp

Type MKC, Fused Safety First Switch Condulet

Type LB, Obround Condulet Body with Blank Metal Cover



Type C, Obround Condulet Body

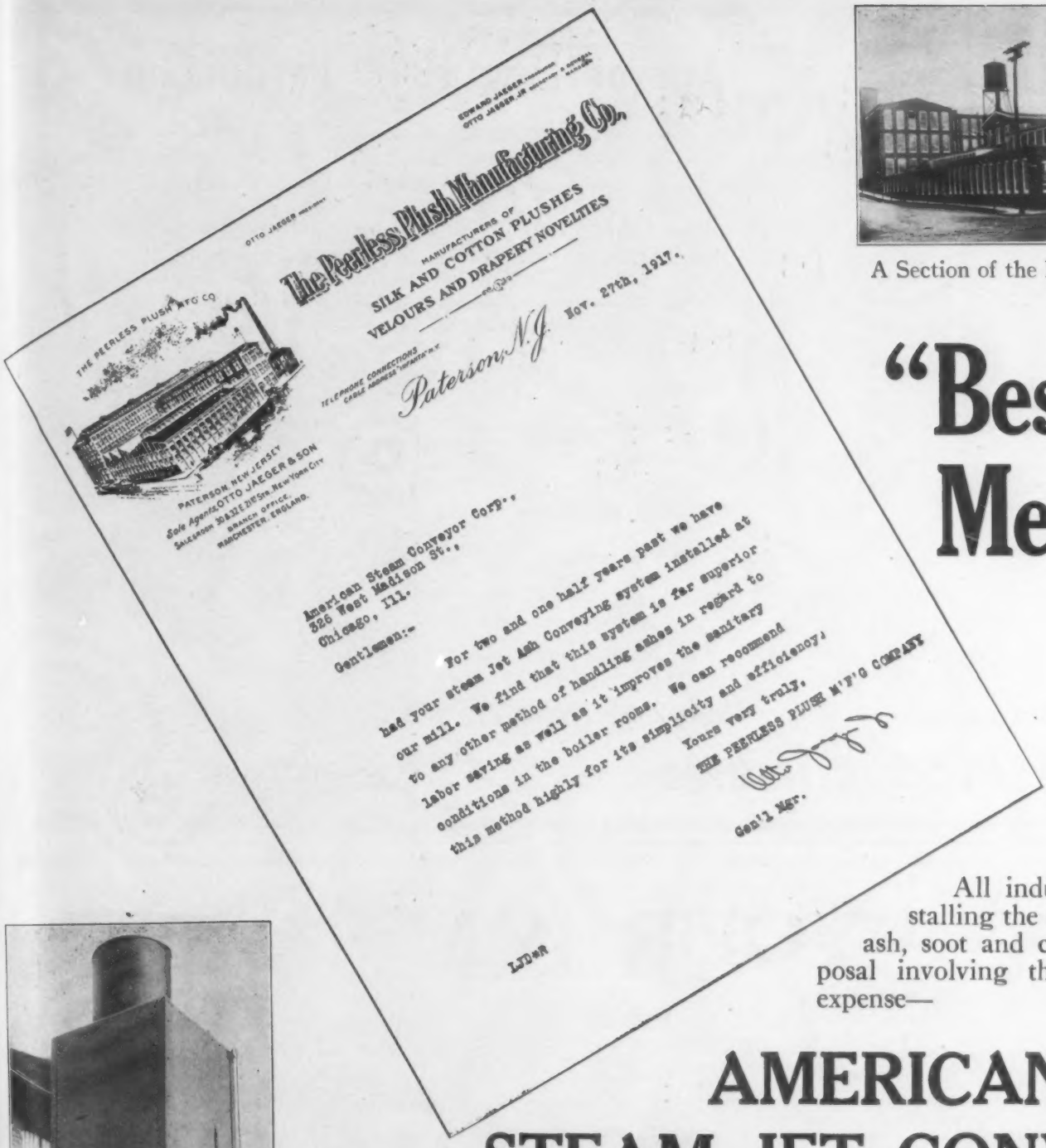
Type UB, Obround Condulet Body

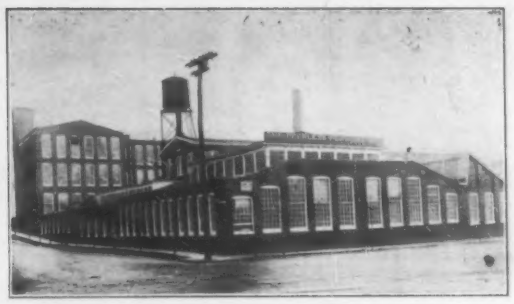
Type MFC, Fused Motor Starting Switch Condulet

CROUSE-HINDS COMPANY

SYRACUSE, N. Y., U. S. A.

NEW YORK BOSTON CHICAGO


THE PEERLESS PLUSH MFG CO
PATERSON NEW JERSEY
Sole Agents OTTO JAEGER & SON
Salesroom 38 & 40 E 19th St. New York City
BRANCH OFFICE
MANCHESTER, ENGLAND.
EDWARD JAEGER PRESIDENT
OTTO JAEGER JR SECRETARY & GENERAL MANAGER
The Peerless Plush Manufacturing Co.
MANUFACTURERS OF
SILK AND COTTON PLUSHES
VELOURS AND DRAPERY NOVELTIES
TELEPHONE CONNECTIONS
CABLE ADDRESS "PEPMFG" N.Y.
Paterson, N.J. Nov. 27th, 1917.
American Steam Conveyor Corp.,
326 West Madison St.,
Chicago, Ill.
Gentlemen:-
For two and one half years past we have had your steam Jet Ash Conveying system installed at our mill. We find that this system is far superior to any other method of handling ashes in regard to labor saving as well as it improves the sanitary conditions in the boiler rooms. We can recommend this method highly for its simplicity and efficiency.
Yours very truly,
THE PEERLESS PLUSH M'F'G COMPANY
Gen'l Mgr.



A Section of the Peerless Plush Plant

"Best Method"

All industries are now installing the automatic system of ash, soot and combustion ash disposal involving the least labor and expense—

AMERICAN STEAM JET CONVEYOR

In view of the present labor shortage this laborless, dustless, instant disposal system is an absolute *necessity* as well a a luxury. Over 700 installations of the American Steam Conveyor have each released one or more men for work in other departments or to serve the colors, at the same time reducing the disposal cost to a few cents per ton.

Before deciding upon any ash conveyor system, demand the following information:

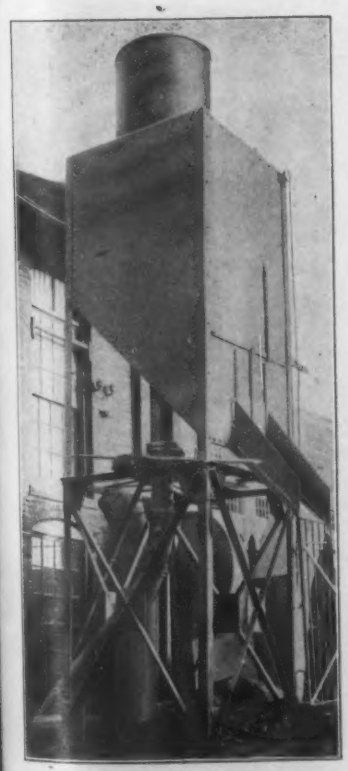
1. List of Installations, with number of years in service.
2. Bona-fide Letters from Owners, Superintendents and Engineers, setting forth their unbiased opinions of the system.
3. Engineering Data, including Preliminary Survey and Report, Maintenance and Cost Figures and Demonstrated Saving.
4. Invitation to make Personal Inspection of Installation located near you.

Write us today for this data on the American Steam Jet Conveyor, also Catalog and booklet, "Modern Methods of Ash Disposal."

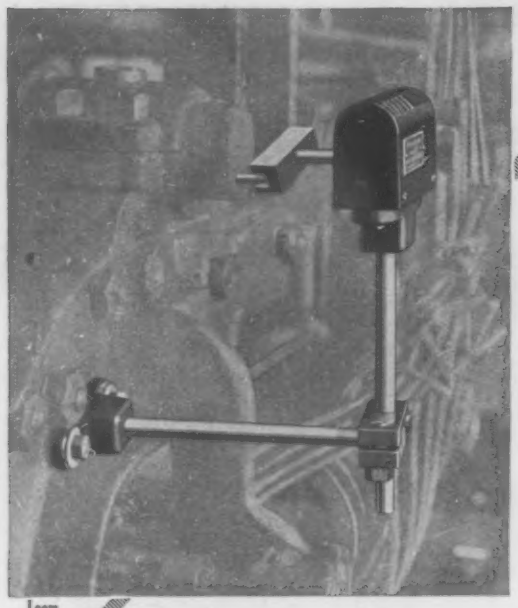
AMERICAN STEAM CONVEYOR CORPORATION

CHICAGO: 326 W. MADISON STREET NEW YORK: 50 EAST 42ND STREET

Sales and Engineering Offices in All Other Principal Cities



The ash storage hopper for wagon loading at the plant of the Peerless Plush Company. This picture illustrates the adaptability of our system. The conveyor pipe leads from the boiler room through the window opening and into the bottom of the storage hopper.



Loom Pick Counter

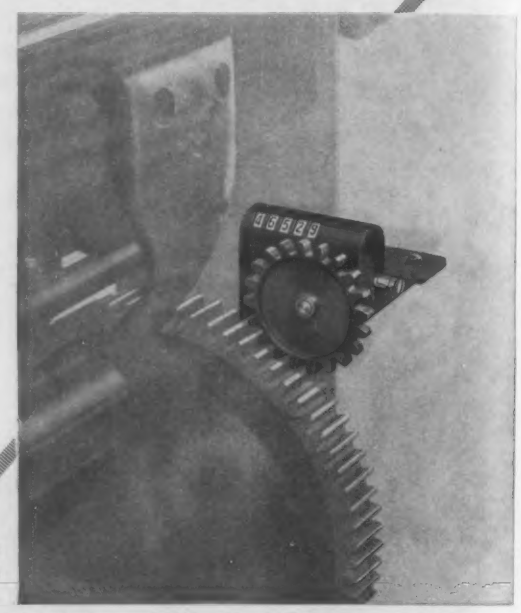
Approaching 100% Production

Even your fastest operators will speed up their work if you set a definite goal for them to reach. Give each operator a chance to earn more. Make increased production worth while for every workman.

Other mills are doing it—increasing output, decreasing unit costs, making their operators more satisfied—by using the Productimeter.

Labor shortage makes it essential to get maximum production from each operator. High wage scale makes it necessary to check up each operator's daily output.

Know exactly what is produced each hour, each day, by each loom. Use the Productimeter—the accurate and reliable counter.



Loom Yardage Counter

Loom Pick Counter and Loom Yardage Counter shown here attached.

Large, black figures on a white background—easy to read at a distance.

Send for one or both of these models. Try the Productimeter on your own looms for 30 days. No obligation to buy. Write today for catalog No. 120

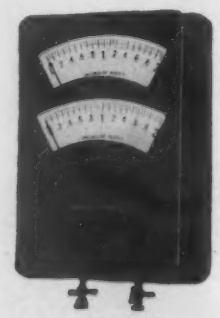
DURANT MFG. CO. Milwaukee, Wis.

The Productimeter

60 Day Recording Gauge

YOUR AIM

should be not alone to get after the leaks in your BOILER SETTINGS, but to keep after those leaks; and maintain Efficiency at MINIMUM costs in your Boiler Plant. Give your Engineer and Fireman adequate apparatus for these RESULTS. You will be more than repaid not only in DOLLARS saved, but in the interest shown by your Fireman.



2 in 1 Gauge

Precision bulletins are yours for the asking. They include our A B C of Combustion, a valuable asset to your plant. It gives you many valuable points on proper firing and coal burning.

CO2 Recorder

Illustrated here are the CO_2 Recorder for continuous record, and two types of Gauges. We can supply you with all types, all ranges, from the simplest U tube gauge, the slant tube of Micrometer Gauge, the 3 in 1 type for forced draft, 2 in 1 for natural draft Boilers.

3 in 1 Gauge

Precision Instrument Company

Engineers

Detroit Michigan

R. L. HOLT, PRES. & TREAS. J. H. HOLT, VICE PRES. W. L. HOLT, SEC'Y.

THE GLENCOE MILLS
MANUFACTURERS OF FANCY COTTON GOODS

Burlington, N.C. Nov. 12, 1917.

Mr. Hampton Smith, Southern Manager,
Steel Heddle Mfg. Co.,
Greenville, S.C.

Dear Sir:-

The set of loom harness sent you on Saturday was operated constantly for fifteen years, and shows the actual condition of the heddle eyes after this continuous service, as they were taken from the first loom that we came to, without previous examination.

These heddles have given perfect satisfaction, and it seems quite remarkable that they show so little wear.

Yours very truly,
Glencoe Mills.
R. L. Holt
Pres. & Treas.

RLH/h.

Stop—Look and Enlist

to help the Government in clothing our *Army* and *Navy*. The top-notch production is needed—why not—employ the best Heddle and Frame to receive the required returns. Read the letter alongside and follow the most progressive and leading manufacturers in this country and Canada.

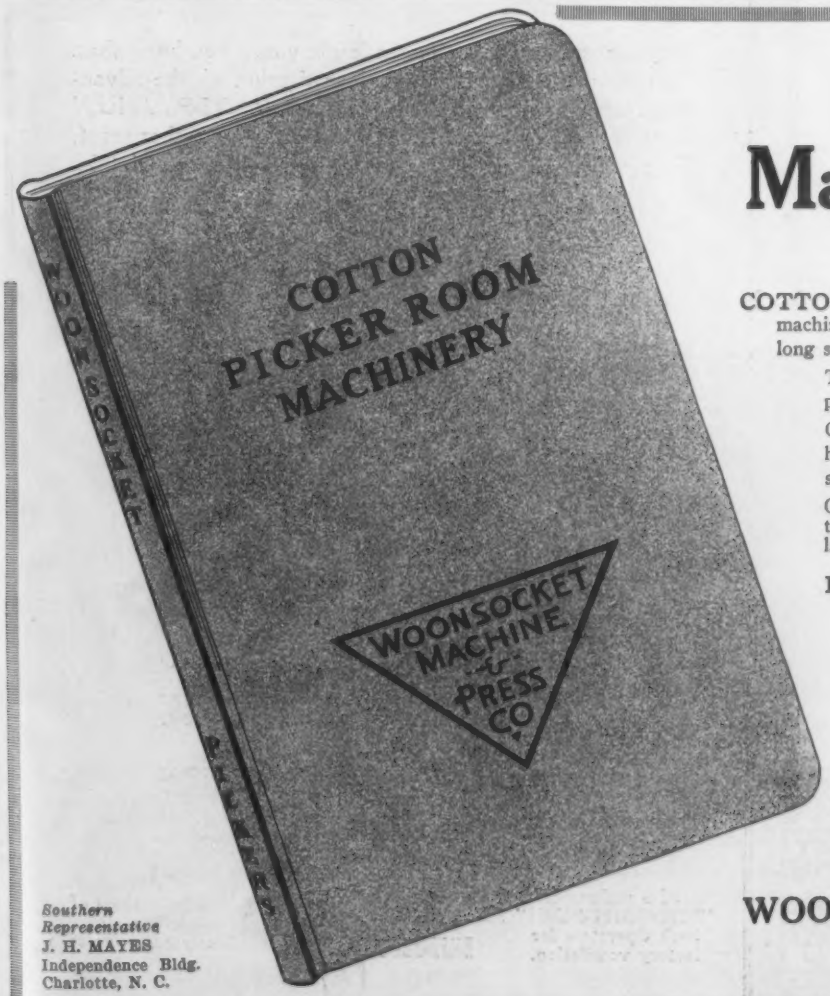
STEEL HEDDLE MANUFACTURING CO.

Manufacturers of "Ideal" and Universal Iron End Frames; Steel Heddles; Doup Heddles; Reed Wire; Drop Wires; Spacers and Everything that makes for Money Saved.

2100-2118 ALLEGHENY AVENUE
PHILADELPHIA, PA.

New England Office
76 Dorrance Street, Providence, R. I.

Southern Office
Mills Bldg., 111 Washington Street, Greenville, S. C.



Southern Representative
J. H. MAYES
Independence Bldg.
Charlotte, N. C.

Two New Machinery Catalogs

for Cotton Manufacturers

COTTON PICKER ROOM MACHINERY—In the manufacture of the machines illustrated and described in the pages of this book we have given long study to the demands of cotton spinners.

The result is a higher standard of Picker Room equipment than has been produced heretofore.

Combined with the many points of efficiency of these machines are the high-class workmanship and material which have entered into the construction of all our products for forty years.

Our Picker Room Machinery represents an equipment which will meet the most exacting demands and will produce clean, even, and uniform laps—the first requirement of successful subsequent processes.

ROVING FRAME CATALOG just off the press, testifies in a convincing manner to the progress we have made in the development of this type of cotton machinery.

Woonsocket Frames continue to maintain their superior position for quality and service among the mill men throughout the cotton trade.

Cotton Bale Openers
Lattice Conveyors
Pneumatic Conveyors
Hopper Feeders
Breaker Pickers
Intermediate Pickers
Finisher Pickers
Thread Extractors
Revolving Top Flat Cards
Drawing Frames
Slubbing Frames
Intermediate Frames
Roving Frames
Jack Frames
Roving Waste Openers

WOONSOCKET MACHINE & PRESS CO.

Woonsocket, Rhode Island, U. S. A.

Stanley Belting

is of solid woven cotton. There are *no plies* to come apart, and *no stitching* to break or wear through

Stanley

is the most *flexible* belt made owing to its peculiar *lock hinge weave.* It can be run over the smallest pulley without slipping or cracking.

Stanley

is *uniform* in thickness giving a perfect, steady drive *assuring maximum* transmission of power.

Stanley

is *unaffected* by extreme heat, oil, grease, fumes, etc., and is therefore especially adapted for dyehouse use.

Stanley

under normal conditions will *not stretch* more than 2% which is usually taken out within the first 48 hours of service thus *avoiding* frequent *delays.*

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Badger-Packard Machinery Co. ..... Milwaukee, Wis.
Badger-Packard Machinery Co. ..... Racine, Wis.
Barrett Hardware Co. ..... Joliet, Ill.
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Gordon Supply Co. ..... Chicago Heights, Ill.
Hawkeye Supply Co. ..... Mason City, Iowa
E. A. Kinsey Co. ..... Cincinnati, O.
Laib Company ..... Louisville, Ky.
Laib Company ..... Evansville, Ind.
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Chicago Pulley & Shafting Co. ..... Chicago, Ill.
Globe Machinery & Supply Co. ..... Des Moines, Iowa
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McMaster Carr Supply Co. ..... Chicago, Ill.
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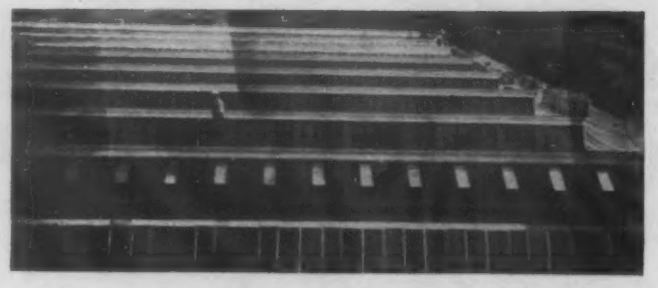
Pennsylvania Roofing & Asbestos Co. ..... Oil City, Pa.
Edw. Soph Co. ..... Tulsa, Okla.
Edw. Soph Co. ..... Muskogee, Okla.
Warren Corning Co. ..... Chicago, Ill.
H. P. Weller Supply Co. ..... Erie, Pa.

Stanley Belting Corporation
32-40 So. Clinton Street
CHICAGO
Send for Catalogue D

"ANTI-PLUVIUS" (Trade Mark) Puttyless Skylights



Let us make a free light inspection of your plant

Machinery may be poorly placed in regard to light. Inefficiency in work may be due to poor light.

Depreciation in materials may be caused through leaking roofs.

Accidents may be occurring which good light would avoid.

Artificial light may be an expense which could be reduced.

Any one of these factors means loss to you. You know that. The remedy is in a thorough investigation of the advantages of a daylight roof—a Drouvé "ANTI-PLUVIUS" Puttyless Skylight roof—the roof which is weather proof, fire proof, durable, safe, easy to repair and cheap to maintain.

"ANTI-PLUVIUS" Puttyless Skylights

will { protect your equipment
reduce expense of artificial light
decrease number of accidents
insure maximum production through better conditions
make your men more satisfied
increase value of your plant }

"ANTI-PLUVIUS" Puttyless skylights have patented points of superiority which will prove mighty interesting to you.

Start up the investigation to-day. We are ready.

Also makers of "STRAIGHT-PUSH" Sash Operators for factory ventilation.

THE G. DROUVÉ CO.
BRIDGEPORT, CONN.

Also makers of Lovell Operators for heavy top-hung sash.

THE TEXTILE DEPARTMENT

SERVICE OF COOPERATION

Women's Work In War Time

The Textile Department has recently published a booklet on the substitution of female labor for male in 20 leading industries.

The information in this booklet was compiled from original sources and is of great value to American manufacturers, for what Europe has achieved, and what mistakes Europe has made, are to-day of keen interest to the employers of America, now that we are ourselves in the war and facing a steadily growing shortage of labor.

THIS Department has been established by the Merchants National Bank of Boston to furnish textile and allied industries reliable statistics and reports of important developments in every branch of textile activity. It investigates new fields, initiates original research work and collates and makes available pertinent data in regard to mills, machinery and markets. Conditions, prices, costs, supplies, demand, deliveries and prospects, general and local, are subjects for its investigation. Domestic and foreign trade opportunities are investigated and presented in the form of detailed reports. Data on idle mill sites, water powers and factory buildings, labor conditions in different localities and schedules of wages of operatives in the various centers are available.

You are invited to make full use of the facilities this Department offers and we shall welcome the opportunity to be of service.

The Quest of The Long Staple Cotton

This brochure describes the various long staple cottons and indicates the localities from which the world to-day receives its supply of this important product. The use of Egyptian and Sea Island cottons has expanded entirely out of proportion to the production so that it is a generally recognized fact that either the acreage planted must be greatly increased or substitutes must be used. Under such conditions this study of the situation is of especial value to all users of long staple cotton.

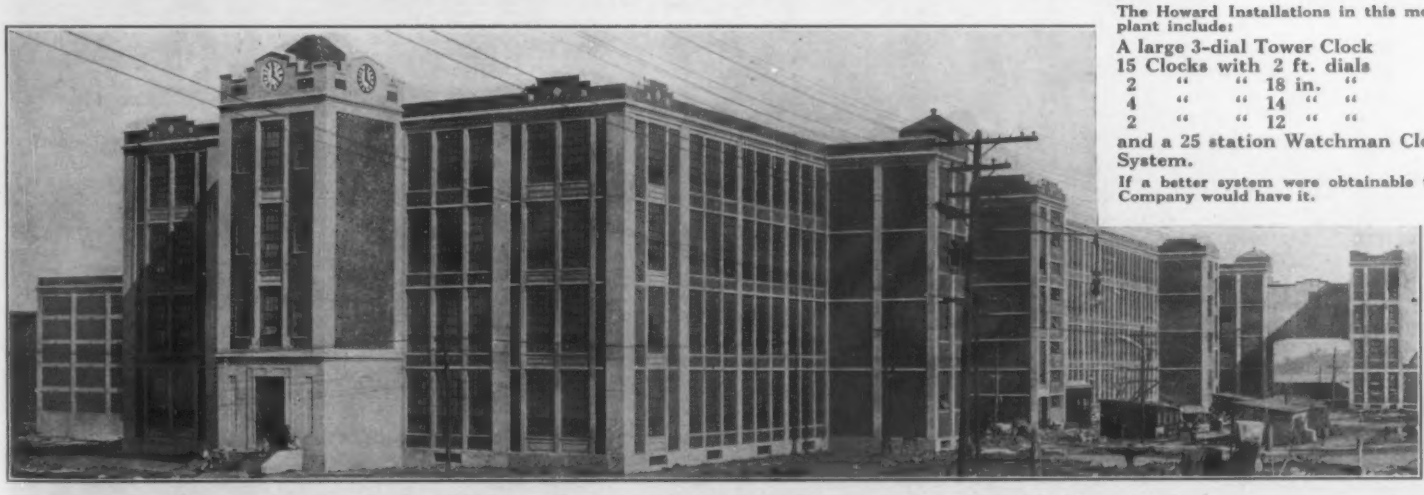
MERCHANTS NATIONAL BANK

28 STATE STREET, BOSTON

Copies of publications of the Department will be sent on request, and we shall be glad to place the names of any interested on our mailing list to receive from time to time information which may be of value.

The Enormous New Mills of the Naumkeag Steam Cotton Co.
are completely equipped with

HOWARD TOWER CLOCKS and WATCHMAN CLOCKS



NAUMKEAG SPINNING MILL (SOUTH SIDE) SHOWING WEAVE SHED TOWER WITH HOWARD CLOCK

The Howard Installations in this model plant include:

A large 3-dial Tower Clock
15 Clocks with 2 ft. dials
2 " " 18 in. "
4 " " 14 " "
2 " " 12 " "
and a 25 station Watchman Clock System.

If a better system were obtainable this Company would have it.

This is but one of the hundreds of textile mills that have installed Howard Tower Clocks and Watchman Clocks after the most careful investigation and comparison, some of the most recent being Eagle Silk Co., Duplan Silk Co., Dorranceton Silk Works and S. Slater & Sons (Wuskanut Mill.)

The leading concerns in every industry have long recognized the supremacy of Howard Clock Service.

Howard Watchman Clocks will Save You a Large Percentage on Your Insurance

Write for Our Mill Catalog

THE E. HOWARD CLOCK COMPANY Boston - New York - Chicago

1842 Leaders Then——Leaders Now 1918

KINDLY SEND ME A COPY
OF YOUR CATALOG NO. 38

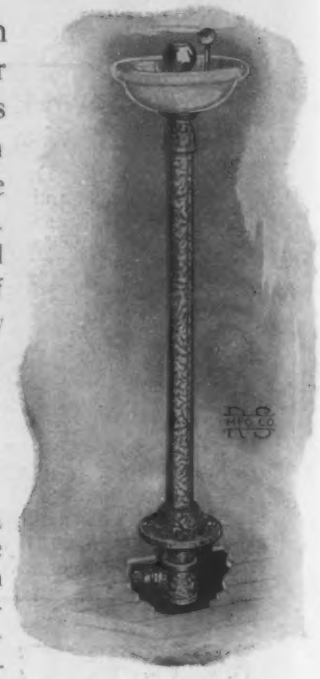
Name.....

Address.....

How About the Drink Question?

You, as a progressive manufacturer, first investigate and then install every improved item of machinery which will raise your output. The universal necessity for increased efficiency demands it. But do you realize that their actual value depends upon the efficiency of the men who operate them? Thirst, the kind that is satisfied by cold, pure water only, must be quenched. If it is not, this personal efficiency, so vital, will more than cancel the mechanical efficiency which you buy. Respect the needs of your men. Provide good drinking facilities in abundance by equipping adequately with

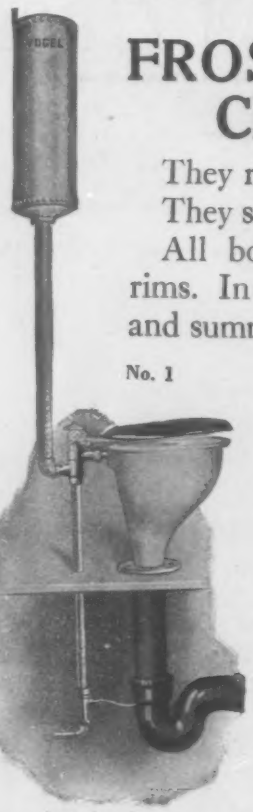
R. & S. Fountains



These sturdy barrels packed with ice will immediately supply a clear, cold drink from a galvanized coil of ample size. They have been designed to meet the most exacting requirements of modern fountain systems with the added advantages of long life and reasonable price. Made in a variety of sizes to meet your most exacting requirements, either for office or shop. Write today explaining your requirements, and we will be glad to explain without cost, the most efficient installation for your purposes. *Do it now.*

Rundle-Spence Mfg. Co., Milwaukee, Wisconsin

VOGEL PATENTED **Over Quarter of a Million** **VOGEL** PATENTED



FROST PROOF CLOSETS

They require no pit.
They save water.
All bowls have enameled rims. In service daily, winter and summer.

No. 1

Giving Satisfaction in All Climates

The ideal water closets for Factories and Mill Villages, where thousands have been installed.

The most durable water closets made—excepting none.

Every Fixture Tested Under Hydraulic Pressure Before Leaving Factory.

Insist On Getting the Vogel

For Sale by Jobbers Everywhere

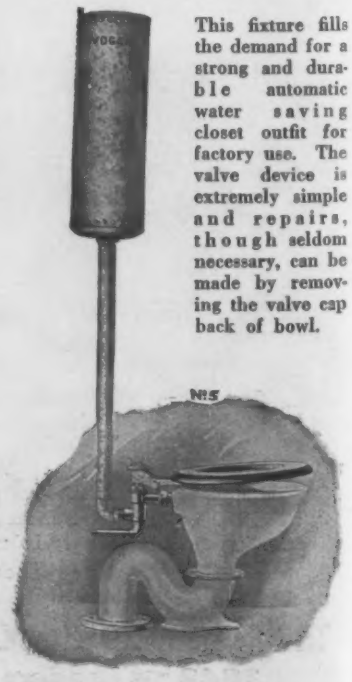
JOSEPH A. VOGEL CO.

Factory and office at

WILMINGTON, DEL.

Warehouses at Baltimore, Md., and St. Louis, Mo.

No. 5
FACTORY CLOSET



This fixture fills the demand for a strong and durable automatic water saving closet outfit for factory use. The valve device is extremely simple and repairs, though seldom necessary, can be made by removing the valve cap back of bowl.

Stronger, Neater, More Economical Baling

THE SIGNODE SYSTEM consists of encircling a package with SPECIAL SIGNODE STRAPPING, drawing the strap very taut and interlocking the overlapping ends within a metal sleeve (SIGNODE) in such a manner that the joint has greater tensile strength than the strap itself.

From every point of comparison the SIGNODE SYSTEM is superior to other methods of baling—it is easily and more quickly applied and shows a saving both in material and labor cost.

"Signode System" Guarantees Safety

By its use several feet of Tie to each bale are saved. There are no jagged ends of strap to injure freight handlers. (Our Bale has been approved by the National Safety First Congress.)

SIGNODE TIES DO NOT STRETCH. They have from 60% to 80% greater tensile strength than the ordinary bale tie. Therefore, the bale can be reduced to required density and POSITIVELY HELD.

Already adopted by the leaders in various lines, this SYSTEM is destined to replace entirely all other fastening and sealing devices.

Write for Full Details

Signode System, Inc.

108 W. Lake St. Chicago, Ill.

Eastern Branch: 143 Liberty Street, New York City

"SIGNODE SYSTEM"

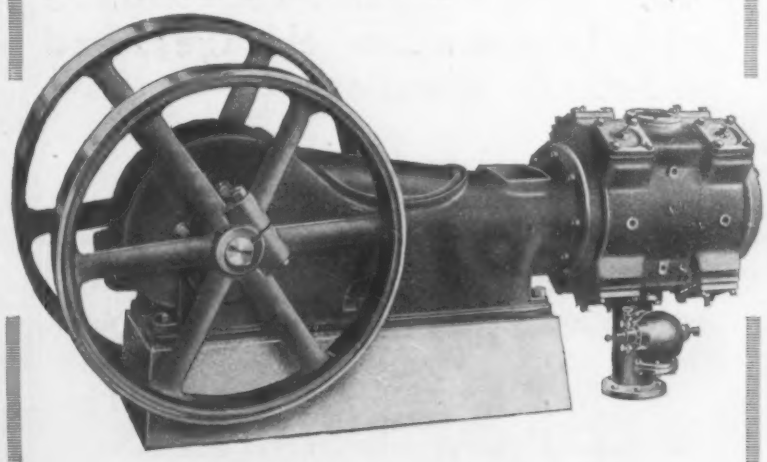
Compressed Air *for* TEXTILE MILLS

The principal advantages of compressed air for textile mill service are safety to operators and equipment, absence of fire hazard, cleanliness, simplicity, low initial and upkeep cost of machinery and economy of operation.

Its adaptability and economy are so apparent that, when once installed, applications multiply rapidly, facilitating and quickening many operations.

Among the more common uses of compressed air in textile mills are the following:

For operating Humidifying Systems.
For cleaning with the air jet such machinery as looms, spindles, hoppers, carding machines, slashers and pulleys, shafting, pipes, beams, boiler tubes, flues, etc.
For moistening stock by spraying.
For introducing moisture into conditioning machines.
For pumping water by the "air lift" or "pneumatic displacement" system.
For agitating, elevating and transferring dyes, acids, bleaches and other solutions.
For operating portable pneumatic metal or wood drills, saws, grinders, buffers, boiler tube scale removers, chipping and riveting hammers, etc.
For operating Pneumatic Motor Hoists, Cylinder Hoists, Elevators and Motors.
For operating Compressed Air Locomotives for yard haulage.
For intensifying the flames in singeing and calendaring machines.
For operating baling presses.
For operating elevator doors and gates.
For operating such special textile machinery as stock guiders and feeders.
For blowing signal or fire alarm whistles.
For charging "dry pipe" automatic sprinkler systems.
For painting and whitewashing.



"INGERSOLL-ROGLER" AIR COMPRESSORS

Supply the need for a reliable source of air power.

They are inexpensive to operate, highly automatic and thoroughly dependable.

Built steam and power driven.

Ask for Bulletin 3130 and 3031

INGERSOLL-RAND CO.

11 Broadway, New York 165 Q Victoria Street, London

Offices the World Over 137-M

Used in More Than 4,000 Leading Plants

The OIL paint with a glossy tile-like finish. Made by a special process over which we have exclusive control. Contains no varnish. It's firm, yet elastic, surface will not crack or scale, for it expands and contracts with temperature changes, and withstands vibrations.

THE DIFFERENCE

Barreled Sunlight remains white long after other paints have turned yellow. It can be washed clean when other paints need recoating.

ON CONCRETE SURFACES—

Rice's Granolith makes the best possible primer for "Barreled Sunlight," retarding the progress of moisture in the wall.

Rice's GRANOLITH.

"THE YELLOW PERIL"

Write for our booklet, "The Yellow Peril" and Sample Board.

U. S. GUTTA PERCHA PAINT CO.

20 Dudley Street Providence, R. I.

The Wing Screw Propeller Fan

More Air for Less Money

The Wing Screw Propeller Fan operates quietly at high speed, and therefore supplies as much air as fans larger in size. This means that you can get a greater amount of air through the same space at a greatly reduced operating cost.

In fact, we guarantee that this fan will move a greater volume of air per unit of power than any other fan on the market, size for size. Wing Screw Propeller Fans have earned their reputation on sheer merit and are universally used throughout the Textile Industry for Ventilating, Drying, Cooling, and Dyehouse Defogging. They are unexcelled for duct work.

The fan wheel is a true screw—a helicoid of revolution—designed to develop pressure or suction, as desired; and in the smaller sizes is cast of aluminum in one solid piece. Motors are fully enclosed and dirt proof.

Our Service Department will gladly cooperate with you in selecting the proper fan. Write for further information.

Turbine Driven Blowers for Forced Draft. Wing Disc Fans. Pulley and Motor Driven Vacuum Blowers. High Pressure Blowers. Damper Regulators.

L. J. Wing Mfg. Co.

358 West 13th St., New York

Oxy-Acetylene Welding and Cutting

Here's an urgent repair made "on the spot" by the Prest-O-Lite Welding Process. The damaged teeth on this gear wheel were built up, quickly, at very small cost.

Saves You Time and Money on Speedy Repair Jobs

FOR repairing operating machinery quickly—when a breakdown threatens a shutdown—oxy-acetylene welding is saving time, money and eliminating the necessity of purchasing many expensive replacement parts.

The Prest-O-Lite outfit is portable—enables you to effect permanent metal repairs *anywhere in the plant* at relatively low cost.

Using the Prest-O-Lite Process, America's foremost textile mills are now making immense savings of time and money on repairs. In hundreds of cases, instead of buying new parts when machines break down, these mills repair the damage in quick time, at small cost, by welding. Formerly the broken machines were idle until new parts arrived, which often meant days of costly delay.

Are you reaping the benefits and savings oxy-acetylene welding makes possible? If not, it will pay you to investigate.

Prest-O-Lite PROCESS

Employs both gases (acetylene and oxygen) in portable cylinders. Acetylene supply is backed by Prest-O-Lite Service, which insures prompt exchange of full cylinders for empty ones. Provides dry, purified gas, insuring better welds, quicker work, and lower cost; also avoids large initial outlay and depreciation.

Necessary equipment is not expensive. We furnish high-grade welding apparatus for $75 (Canada, $100); acetylene service at additional cost. Adaptable for oxy-acetylene cutting by the addition of special cutting blow-pipe. Thorough instructions are furnished free to every user of Prest-O-Lite Dissolved Acetylene—any average workman who understands metals can learn the process quickly and easily.

Mill superintendents will be interested in our special bulletins on many worth-while savings textile mills are making by oxy-acetylene welding. Write today for a copy. Sent free.

The Prest-O-Lite Company, Inc.

U. S. Main Office and Factory,
840 Speedway, Indianapolis, Indiana

Canadian General Office and Factory, Dept. A7,
Toronto, Ontario

59 Branches and Charging Plants

World's Largest Makers of Dissolved Acetylene

"Fibrotta"

COLOR PAILS

Here is the best bucket on the market for your color-mixing and dye rooms. It does not absorb color like wood; it does not rust like metal; it does not break like earthenware; and is not nearly as expensive as copper. It can be easily and perfectly cleaned. It wears longer than wood or metal. It is not affected by dyes or weak acid solutions. "Fibrotta" will not swell, warp, leak or rust.

"Fibrotta" pails are made of wood pulp molded into shape, in one piece without seams, by heavy hydraulic pressure. They are light, strong and durable. A special treatment gives it a hard moisture-proof surface. No hoops to rust and fall off.

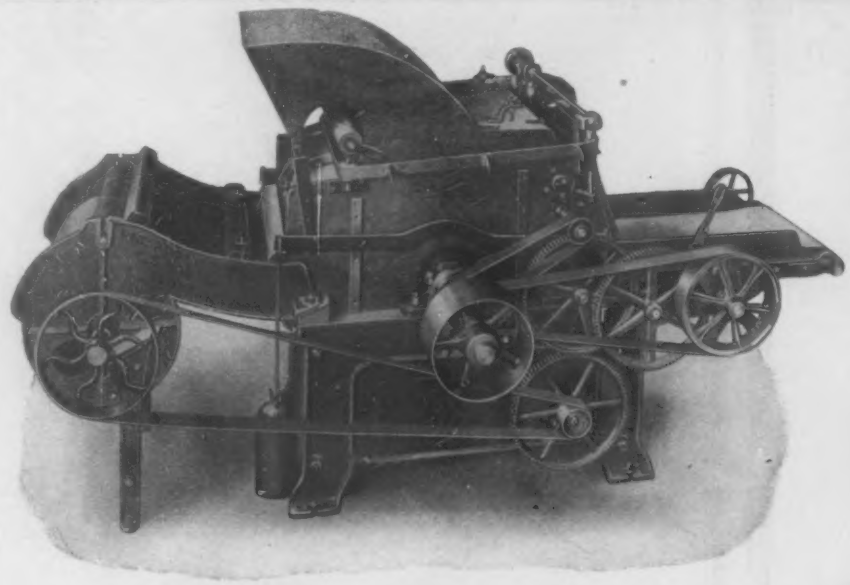
If you are not acquainted with "Fibrotta" Color Pails, write today for our catalog that gives full information and prices.

FIRE PAILS

We also make "Fibrotta" fire pails—a safe, efficient, and economical means of fire protection. Our catalog gives information on all "Fibrotta" products. We also have measures for handling colors in 1 pt., 1 qt. and 1 gal. sizes. They have handles of copper wire.

CORDLEY & HAYES
COOLER HEADQUARTERS

39 Leonard Street New York City



DODGE

—The Best Shoddy Machinery Built

Above is shown the newest Dodge Picker and Condenser in one. Does all work from coarsest to finest. The picked stock is always visible and accessible. No fireproof gauze room necessary, thereby reducing space and fire hazard. Bits and flyings are automatically returned to feed apron. Ball bearing equipped to reduce driving power. All around the last word in Shoddy Pickers.

See this machine at the Textile Exposition, Grand Central Palace, New York, April 29 to May 11, 1918, Space 108.

Dodge Machinery is sold on its Merits—Write for Bulletin

DODGE SPECIALTIES
WOOL BAGGING MACHINERY
SELF-SHARPENING PICKER PINS
PICKERS (described above)
CYLINDER COVERING DONE RIGHT

C. S. DODGE - - Lowell, Mass.

Canadian Agent: W. J. Westaway, 72 James St., North, Hamilton, Ont., or 201 Mappin & Webb Bldg., Montreal, Que.

Standard Mill Supply Co.

Manufacturers of and Dealers in

General Mill Supplies

Roll Coverers, Tools and Supplies

Specialties

Cocheco Short Lap Leather Belt, and Worall Brothers' Comber Needles and Pins

39 Exchange Place **Providence, R. I.**

Exceptional Savings to be Made Now by Welding

Never were such demands placed upon textile machinery. Never was it so difficult to obtain duplicate parts to replace those that have broken down under the strain.

Under these abnormal conditions a

WATERHOUSE
Welding and Cutting Outfit

is invaluable. It is always ready to repair broken machine parts in a jiffy and put them back on the job, thus keeping Production up to top-notch speed. Very often *one* repair job pays for the cost of the entire equipment.

Thousands of manufacturers selected Waterhouse Outfits because of their efficiency and economy. The NON-FLASHING TORCH is a feature which saves more than 20% in gas consumption. By the addition of a single attachment the welding torch is changed to a cutting torch—a further economy.

Here is an opportunity for *you* to insure yourself against breakdown losses. Send the attached coupon now for detailed information.

WATERHOUSE WELDING CO.

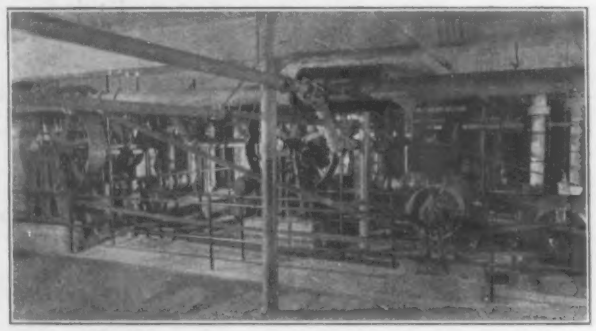
Pelham Street **Boston, Mass.**

Kindly send me complete information about Waterhouse Welding and Cutting Outfits.

Name.....

Address.....

A Real Test of Pump Service



Goulds Triplex Pumps. Used for Humidifying Service in One of the Largest Textile Mills.

THE selection of Goulds Pumps for Humidifying Service in one of the country's largest textile mills is evidence of their reliability in performance. An interruption in service of this kind would not only mean a loss in the quantity of the mill's production, but in the quality as well. In other words these pumps form one of the foundation stones for that mill's standard of production and reputation for quality.

This is merely additional evidence of the universal reliance among textile mills upon the product of *the world's largest manufacturers of pumps for every service.*

GOULDS PUMPS
FOR EVERY SERVICE

Fire Pumps	**Scouring**
Water Supply	**Dyeing**
Filter Service	**Bleaching**
Boiler Feed	**Sizing**
Return Feed	**Finishing**
Hot Water System	**Acids, Chemicals**
Booster Service	**Elevators**

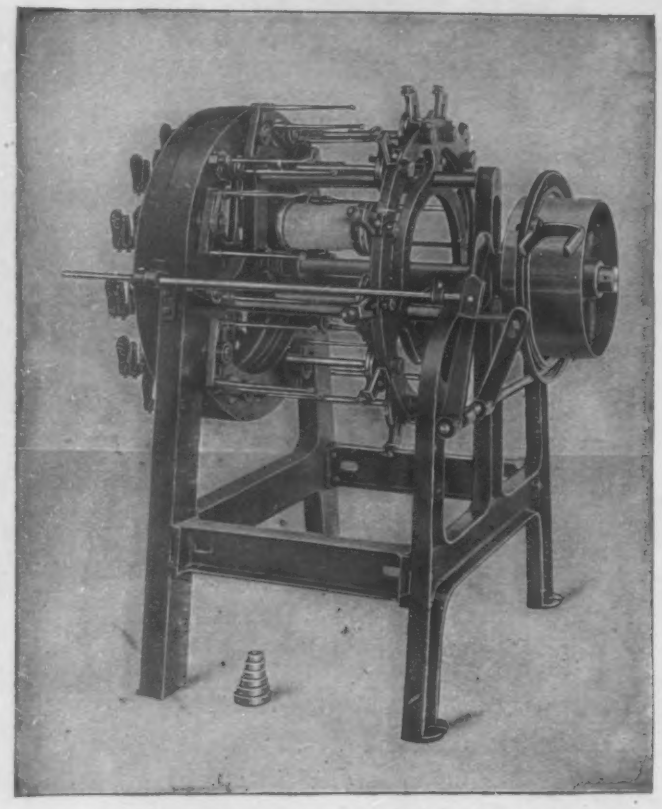
In Writing for information advise type of service

Have you a complete set of Goulds Bulletins on file?

The Goulds Manufacturing Company
MAIN OFFICE AND WORKS
Seneca Falls, N. Y.

New York 38 Murray St. Boston 48 Pearl St. Chicago 15-16 S. Clinton St. Philadelphia 111 North 3rd St. Pittsburgh 636 Henry W. Oliver Bldg. Atlanta 3rd Nat'l. Bank Bldg. Houston 1011 Carter Bldg.

THE HASKELL-DAWES MACHINE CO.



HASKELL-DAWES 12-SPINDLE TUBING TWISTER

Manufacturers of the best types of

FORMING, TWISTING AND LAYING MACHINERY

which are adapted for making all kinds of

Cotton Cable-Laid Twine Cord and Rope

¶ The Haskell-Dawes Machines are built upon a NEW PRINCIPLE whereby the MOST POSITIVE RESULTS ARE SECURED. They occupy LESS SPACE than the ordinary type of machines, require LESS RELATIVE POWER, and will turn out a MUCH LARGER PRODUCT of Twine and Rope.

¶ The SPECIAL ATTENTION of Cotton Manufacturers is called to our NEW FORMING AND ROPE LAYING MACHINES and also to our

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Descriptive Catalog sent on application

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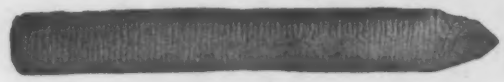

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No. 1 and No. 2 Cops to weave from inside seven-eighths to three inches diameter and up to seventeen inches long. Suitable for various kinds of coarse goods, such as grass matting, cotton bagging, cocoa matting, all kinds of carpets, felts, chinchilla, linen, jute, flax, asbestos, hose and narrow fabrics, such as wicks, belting, webbing, sursingles, halters, etc.

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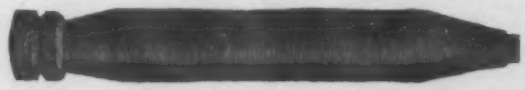

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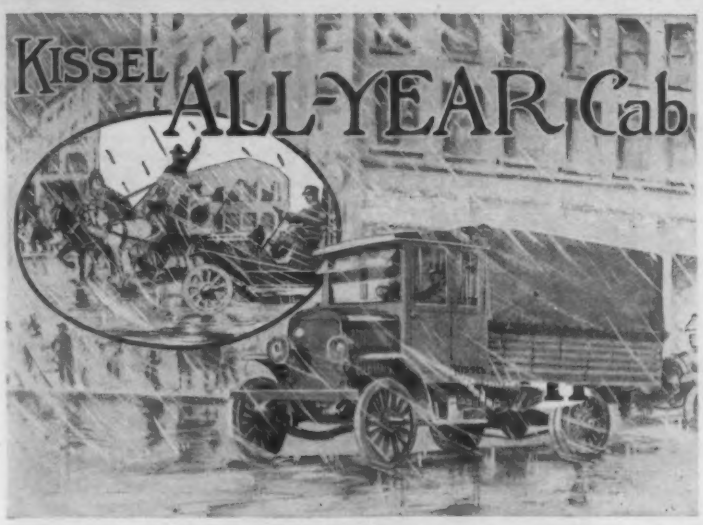
JOHN HILL, Third National Bank Building, Atlanta, Ga., Agent for the Southern States.



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Closed for Winter

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NO longer are motor truck owners in the textile industry handicapping their drivers by purchasing trucks without the ALL-YEAR Cab. It solves the truck owner's problem of maintaining winter haulage and delivery schedules. It discourages speeding, diminishes possibilities of accidents and excessive wear and tear, and insures competent handling and care of trucks by attracting high class operators.

The ALL-YEAR Cab in winter is entirely closed and is wind, rain and cold-proof. In summer it is quickly changed to an open, cool housing by removing the winter attachments.

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Five New Sizes—A Truck for Every Business—A Size for Every Purpose

Ten years of practical truck building experience are back of the new line of Kissel Trucks. The Kissel combination of perfected worm drive rear axle, sturdy Kissel-built power plant, reliable axles and dependable brakes, insures uninterrupted performance.

Investigate Kissel Trucks and the ALL-YEAR CAB. Send for specifications and literature

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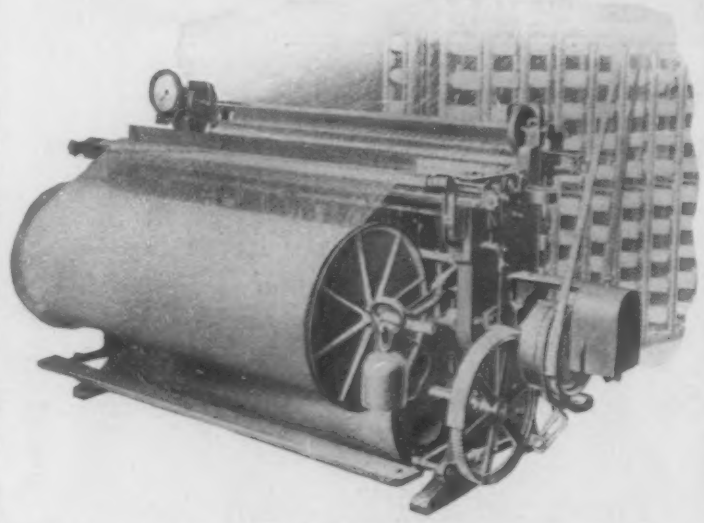

The Entwistle Slasher Warper is the result of a quarter-century of manufacturing *dependable* Warpers. While the design is simple, these machines possess many distinctive trouble-saving features.

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Get in touch with our Engineers and ask them about this machine or any of those listed below.

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Slasher Warpers	**Expansion Combs**
Ball Warpers	**Creels**
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Lowell, Mass.

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Southern Representative
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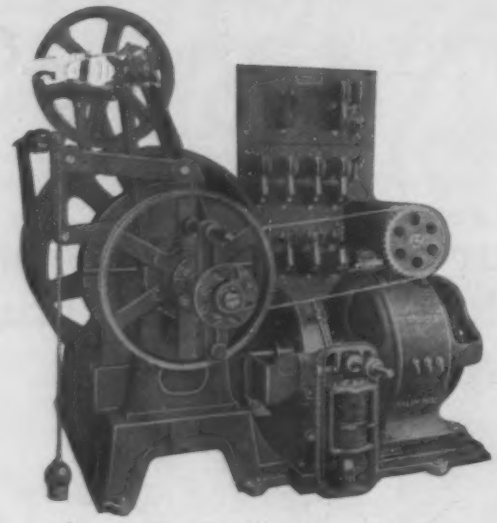

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We invite the fullest investigation into the records of

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Especially Adaptable for Textile Mills

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DINSMORE MILL SEWING MACHINES

AND IN KNITTING MILLS, PRINT WORKS AND BLEACHERIES
THE "DINSMORE" IS FULFILLING ALL REQUIREMENTS

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They sew nearer the edge than other machines — saving big losses

They sew straight — never in crooked lines.

They do not require skilled help—big saving.

They keep the cloth clean and free from wrinkles.

They cannot be surpassed for speed.

They sew wet or dry cloths, thick or thin.

They know no superiors in workmanship.

They have no rivals in quality.

They pay for themselves in six months.

All users of them agree that the "Dinsmore" are the most efficient and economical mill sewing machines produced. We would be glad of the opportunity to convince you.

We have a complete descriptive catalog of sewing machines which is yours for the asking.

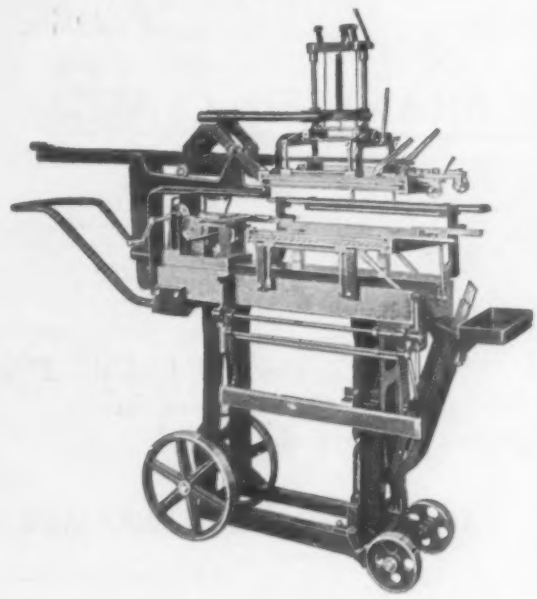
A full line of sewing machine supplies always on hand.

Rayer & Lincoln Rotary Sewing, Trimming and Marking Machine

Dinsmore Manufacturing Company
SALEM, MASSACHUSETTS

Warp Tying Machine

MODEL K



A portable machine for tying-in warps behind the loom.

It will handle a wide range of patterns and yarns—Ducks, Tire Fabrics, Towellings, Damasks, Crochet and Satin Quilts, Dobbys, Double Beam Work, Blankets, Corduroys, Fancy Worsteds, Plush, Velvets, Tapestry—at the rate of 2500 to 4000 ends per hour.

Loom production increased.

Tying-in or twisting-in cost decreased.

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Single and ply worsteds.

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ALL MACHINE BUILDERS ARE AGENTS and will quote prices for new work

For other Information, Prices, Circulars, etc., Write to

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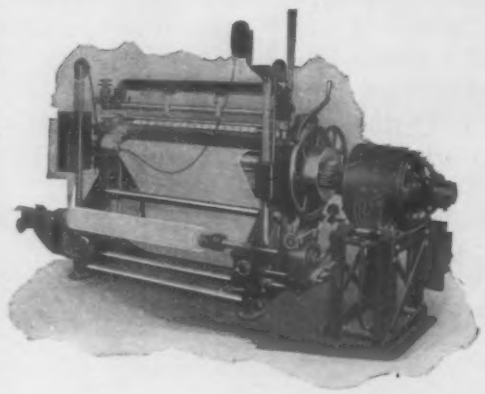

Cameron Bandage Machine

The Cameron Slitting and Rewinding Machine is used for making surgeons' bandages by all the world's biggest surgical supply houses and by many foreign governments for handling their requirements for surgeons' bandages.

This machine can be used to convert practically any kind of material into strips or rolls of narrower width. From 10,000 to 15,000 yards of cloth can be handled by one operator in a nine-hour day.

SPECIAL FEATURES IN BRIEF

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The Cutting is even, smooth and clean.

The Cutters are indestructible.

The Machine is fool-proof both ways: the operator cannot hurt it, and it cannot hurt the operator.

The Rolls produced are firm and evenly rewound.

The Rolls do not interweave or stick together.

Any width strip from ¼ inch up can be obtained.
The Waste or Trim at edges may be extremely narrow.

The Respacing of cutters for new widths requires approximately 5 minutes.

The same feature that makes the machine a favorite for small rolls, or light duty, makes it equally desirable for large rolls or heavy duty.

The machine is the speediest and at the same time the most accurate and simplest to operate.

We will ship a machine on approval anywhere in the United States. Send for catalog and other interesting particulars

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Put Them on Sentry Go in YOUR Mills

In every kind of mill there are many uses for these Counters—ways in which they save money by giving you actual, accurate, figures; preventing mistakes, disputes, losses; speeding production.

Root Counters in your weave rooms will count the number of picks made, showing at a glance the work done by each loom. On the doffers of cards, the feed or delivery roll of dryer or other finishing machinery, they will keep absolute tab on your output.

Don't have counting or measuring troubles. Submit your problems to our Free Engineering Service and get the advantage of our 28 years' experience on just such jobs.

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An instantaneous setback counter. The very thing for short jobs with many repetitions in the course of a day.

Four-figure "Roco"

A rotary counter specially adapted for looms and other similar machinery. Can be operated right or left.

Write for Catalog No. 18 and our new Booklet, "Chidsey's Challenge."

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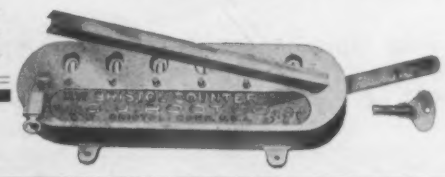
(Also Wrought Brass Hinges, Metal Stampings, Plating and Polishing. Estimates free.)

The famous "Bristol" with lock bar (as shown). It cannot be tampered with yet can be quickly reset to zero and will repeat automatically when highest number is reached.



For six years we have made a study of Quill cleaning machinery.

Now we are in position to offer you the most up-to-date machine on the market.

The "UTSMAN" is the simplest and most efficient type of machine ever built for the purpose.

It is fool proof, of rigid construction throughout, and it is dependable. We have made it thoroughly adjustable to make allowance for a wide variety of quills and can clean with the same machine any standard automatic loom bobbin.

Write for full information, prices and delivery

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Have been used by leading textile mills for a quarter of a century

MILL BRUSHES
of every description and for every requirement for Cotton, Woolen, Worsted and Silk Mills.

BRUSHES REFILLED

THESE BRUSHES
are made by skilled workmen in a thoroughly up-to-date factory and every brush is carefully inspected before leaving the factory.

SAMPLES AND PRICES GLADLY SENT

"SECOND TO NONE ON EARTH FOR QUALITY AND SERVICE"

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MILL BASKETS
for all textile mill requirements. Of the very highest quality White Oak, Hand Made.

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THESE BASKETS
are made under the same careful supervision as Hardy Mill Brushes and are guaranteed to give satisfaction.

Try Hardy Brushes and Baskets in your mill and see the difference

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HUDSON, MASS.

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Roller Covers and Picker Leather
Leather Cots for Spinning Frames

Tannery: KEIGHLEY, ENGLAND

Spinning Tape Specialists

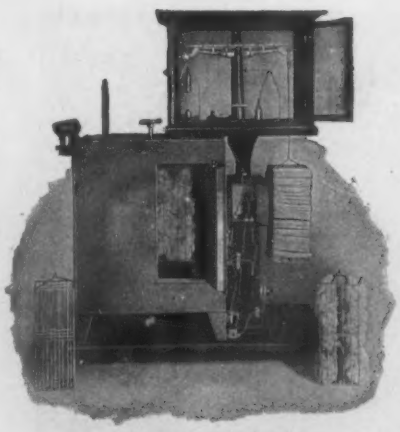
Also

Makers of machinery tapes for all kinds of twisters, winders, spoolers and spinning frames for cotton, worsted, jute, flax and silk machinery.

Barber Manufacturing Co.

Lowell, Mass.

EMERSON CONDITIONING OVENS

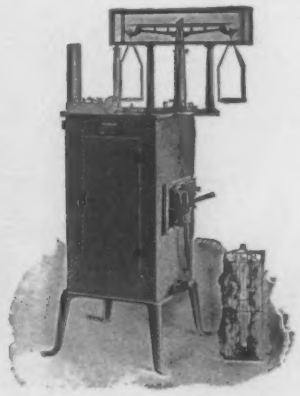


FOUR BASKET OVEN
(Baskets, 7 in. x 7 in. x 18 in. deep)

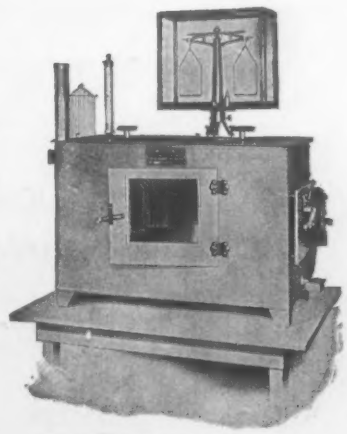
Do You Test Your Textile Materials for Moisture?

The Use of One of Our Conditioning Ovens for This Purpose Will Place Your Mill on an Efficient Basis

Neglect to Account for Moisture Results in Losses



SINGLE BASKET OVEN
(Basket 7 in. x 7 in. x 18 in. deep)



EIGHT BASKET OVEN
(Baskets, 3 in. x 3 in. x 6 in. deep)

There are three sizes of Emerson Conditioning Ovens, the Four Basket and the Single Basket Ovens being equipped with large baskets for bulky material and the Eight Basket Oven with small baskets.

The Emerson Conditioning Ovens are all electrically heated and can be fitted to operate on either A. C. or D. C. circuits. *Write*

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Prominent signs signify a warning—generally of danger ahead! Notice any placard and you usually find that it's the *white* in it which attracts your attention.

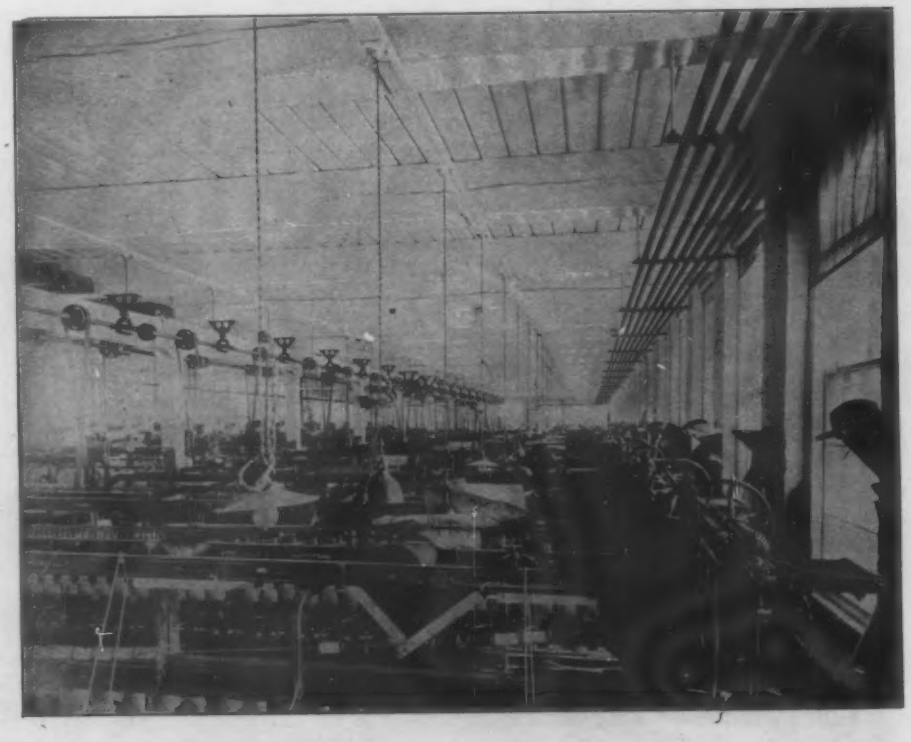
WHY? Any ray of light catching the white in the sign also catches a person's eye. A clean, bright, white-painted surface reflects cleanliness, brightness, less aptitude for accidents, less usage of artificial lighting and less eye strain. Repaint the walls and ceiling of your factory with

INTENSIFIES
CHAFFEE'S MILL WHITE
DAYLIGHT

Note the change Chaffee's Mill White gives—an enamel-like, glossy, reflecting surface, easily cleaned and long wearing.

An interesting booklet sent upon request.

Write us.



Thomas K. Chaffee Company

Providence Rhode Island

Contents for January 12, 1918

Volume LIII, No. 28

FRONT COVER

The "Motif" of the front cover design of this issue, painted especially for TEXTILE WORLD JOURNAL, is to symbolize the relation of industry (in particular the textile industry) to the prosecution of the war. The realism of battle is portrayed by two figures in the foreground going "over the top," the one on the left being an American and the one on the right a French brother in arms. The textile industry which is such an important factor in the World War is symbolized by the mirage of mill buildings in the background.

Copies suitable for framing, with the lettering omitted, will be sent to anyone on request upon receipt of 10 cents to cover mailing costs.

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DYERS OF COLORS FAST TO
SUN AND BLEACHING

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JAN 15 1918

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Textile World Journal

Textile World Journal

Textile World Record—Textile Manufacturers Journal

Published every Saturday by

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C. H. Clark, V. E. Carroll, Clarence Hutton.

A TENET OF OUR CREED: WE BELIEVE IN THE CONSERVATION OF AND PROTECTION TO DOMESTIC INDUSTRIES.

Vol. LIII January 12, 1918 No. 28

THE time to prepare is before the event occurs. The time to kick is when the object is within reach. The time to investigate is before the subject has attained such actual or apparent size that it divides a people which must be united to win. We did not prepare in time, but we as a nation are doing something that a democracy nearly always is prone to delay, and that is to close the barn door before the horse is stolen. The investigation instituted by the Senate Commitee on Military Affairs during the closing weeks of 1917 is non-partisan and non-industrial, yet for Democrat and Republican, for laborer and manufacturer, for every man and woman in these United States it is the source of more certain optimism than any one thing that can be entered upon the debit side of the 1917 ledger, only excepting our advent in the World War.

Preparedness Is Finally Assured and Optimism Warranted

The hopes that are aroused in the popular breast by this investigation are essentially those of co-ordination and solidarity; co-ordination of the service departments of the Government under capable and honest leaders, and solidarity of the American people irrespective of nativity, class or party. It is an expression of the popular demand that the war shall be conducted efficiently without consideration of racial, class or partisan distinctions. It, or succeeding investigations, or legislation must make it impossible for any class or any party to assume credit for the war's successes, or blame for its reverses. They must make it a war of and by the people—a correct reflection of aroused democracy.

Industry and its leaders and laborers must cooperate harmoniously for the common good. They must "do their bit" as courageously, efficiently and unselfishly as any soldier in the trenches, and they who are helping in factory or field to win the war must receive the same impartial and considerate treatment as is given to the men who are earning glory at the front. Sacrifices for the country's present and future safety, must be made in the factory as well as in the trenches. But there must be the same impartial and fair distribution of war priority, commandeering and taxation that there is of the sacrifices required of our armed forces. Industry must be as carefully conserved as our Army and Navy; it asks for no different treatment. Given such a basis of solidarity, co-operation and confidence it makes no difference whether the war lasts one or five years; the result must be victory. With our faith founded upon such a rock the keynote of 1918 assuredly is optimism.

* * *

THE position of the textile industry in relation to the war needs of the Government has been a patriotic one. If proof were needed to confirm this statement, it could be found in the report of the committees that have co-operated with the Council of National Defense in the purchase of supplies. The industry stands absolved of all attempts at profiteering or of selfishness in not contributing of its facilities to the War and Navy Departments. Notwithstanding the testimony of certain officials, it is believed by those who are in a position to know that sufficient fabrics of most qualities have been bought to satisfy the requirements of the various branches of the service for some time to come. If there have been delays or inability to secure sufficient volume of merchandise, it is argued that the fault has been with the policy pursued by the Committee on Supplies of secret purchasing which has not been productive of the greatest possible degree of competition. Further criticism attaches to the fact that requirements were not anticipated, thus allowing insufficient time to satisfy demand.

Textile Industry Established as Patriotic Factor in Furnishing Government Supplies

With regard to delays, it is stated authoritatively that in the great majority of instances, manufacturers have lived up to delivery dates, and in certain important instances it is known they have anticipated the agreed-upon shipments. There have been certain reasons why a few manufacturers have been unable to complete their contracts on schedule time, but for the most part these have been attributable either to labor difficulties or to certain misunderstandings with the Government regarding the supply of raw material. It appears evident that the garment manufacturers must be held accountable for a very large proportion of any delay that has occurred in the delivery of uniforms, due in measure, according to recent testimony, to the fact that the bulk of orders had been placed with a comparatively few houses and not distributed over a large number of those in position to take contracts, thus resulting in more or less congestion.

Regarding the much discussed question of modification of army fabric specifications it would seem as though the recommendations of the civilian committees had provided for fabrics that were as serviceable and durable as any that the Army has ever purchased. There is no doubt that on emergency orders fabrics have been accepted which have fallen below the acknowledged level of excellence. It has been made very plain that committees representing the industry have not been responsible for these emergency fabrics, on which they were not consulted and for which they did not advance any guarantee of satisfaction.

With the appointment of War Service Committees, representing the leading associations in the industry, with designated responsibility in the relations between these committees and the Government, and also with a reconstruction of the purchasing end of the army service tending to greater practical knowledge of the supplies to be purchased, the outlook for continued satisfactory response on the part of the industry to the demands of the Government is very bright. The textile trade is to be congratulated that it has been represented so ably and intelligently before the Quartermaster's Department, and it is not too much to prophesy that its reputation as a patriotic industrial unit will be further enhanced as time goes on.

* * *

WITH the experience that has been gained by textile manufacturers in export markets, with the knowledge of buyers' needs and with the appreciation that unless the foothold which has been established is strengthened there will not be a permanency to our export trade, the new year opens with high hopes of increasing possibilities for the distribution abroad of a very considerable proportion of domestic cotton and knitted products.

Duty of American Manufacturers to Maintain Prominence in Export Markets

There are many arguments pro and con regarding the competition that may be experienced from other nations after the war. There is no gainsaying the fact that extensive preparations are being made by the majority of exporting nations to recoup the losses they have sustained and will sustain during the war. Whether these countries will be in position to interfere seriously with our attempts to expand export outlets remains to be seen. A considerable period after the war must elapse before these nations are in an approximately normal condition and in shape to develop additional business or regain lost trade. Further, the item of labor must of necessity be an important factor in determining the ability of these countries to compete.

Nevertheless, the maintenance of our position in the export trade will depend very largely upon our methods and practices. There is no doubt that the reputation of American manufacturers in certain quarters abroad is none too enviable. It is felt that too often are contracts disregarded or filled indifferently or at the whim of the seller. We do not mean to say that this is the general attitude of the foreign buyer, but if certain markets are to be influenced against this country by the attitude of those who have not had satisfactory experiences with domestic sellers, we will be by so much the loser and certainly we cannot afford to let slip any of the advantages we have gained because of abnormal conditions.

The above statements are all made on the supposition that this country will need additional channels for the distribution of its textile products. Unquestioned authorities unite in declaring that one of the principal causes of business depression in the past, at least in portions of the textile market, has been the disproportion between producing capacity and the demand for mill products. It has been said a good many times that if all the textile machinery in this country were to run to its capacity for a year enough merchandise would be produced to meet the requirements of domestic buyers for at least two years. It is absolutely necessary to have an increasing outlet for textile merchandise and outside of the steady growth of the domestic population, other nations must be sought as additional drygoods buyers. It behooves the textile trade to study the possibilities of foreign business and to make such intelligent and united effort as lies in its power to maintain the comparative position of prominence that it occupies at present.

War Taxation and Effect Upon Business

By *Hon. John W. Weeks,* United States Senator from Massachusetts.

"If the war continues indefinitely the country may be bled white to pay the cost. This burden is unescapable, but if we are bled scientifically it may lead to the purification of our blood. If we are bled wrongfully, it may lead to a pernicious anemia.

"If it had not been for Germany's protective policy, under which industry and agriculture have been protected, fostered, and promoted to their greatest productiveness, her enemies would have been compelled to surrender long ago because of lack of food and material.

"Congress should work out a definite and scientific financial scheme to provide for paying the cost of this war, a scheme which will not be discriminatory, unfair, discourage initiative in business, prevent development of resources and industries, or favor or injure certain classes or groups. Unless we adopt such a course we are going to adversely affect American progress, discourage American efficiency, and in the long run reduce American wages."

THE United States, after a hesitation and forbearance which tried the patience of many red-blooded Americans, has resented the insults and injuries inflicted on our people by the Imperial German Government and has joined the other great civilized nations of the world in an effort to subdue an ambition-maddened monarch and an arrogant nation which seeks to bring all mankind under its yoke. Peace-loving democracy is today battling autocracy; justice and right are fighting greed and selfishness; and liberty is struggling in the grasp of the world's slave master. We have entered a conflict which must be fought to a finish and to victory, for defeat will surely mean the extension of that Kultur inflicted on conquered Belgium and practised in Northern France to the shores of America. The life of our nation is in the balance. Defeat means our submission to the tyranny and dictation of the German Government; victory means that the sacrifices of our forefathers have not been in vain and that this nation will emerge from the crucible of war purified and unified by our sacrifice, a great homogeneous people ready to defend to their last drop of blood American honor and American principle.

TREMENDOUS SACRIFICE OF MEN AND MONEY

The United States has entered this maelstrom of struggling humanity with its eyes wide open to the task confronting it. We realize the great sacrifice we must make. The United States will not only furnish its share of the manpower necessary to win the war, but as the great banker-nation of the world it will furnish a large portion of the funds necessary to carry on hostilities. We already have over a million and a half men under arms or in training, many of them already at the front, and in the coming months our military forces will be increased until the United States will be represented on the field of battle by a mighty army, the loyalty, the courage and the fighting qualities of which cannot be surpassed by any nation in the world. We have appropriated more money during the last session of Congress than has been appropriated by any nation during any one year of the war. Before the end of this fiscal year we will have loaned to our Allies more money than Great Britain and France have loaned during the entire period of the war. We have within six months appropriated more money than some of our Allies have expended during the entire war. When we consider that from the beginning of this Republic up to the present war the United States has appropriated for its maintenance about twenty-seven billions of dollars and within the last few months has appropriated twenty-one billions, we can begin to comprehend the vastness of the financial operations in which we are involved.

BUSINESS MUST BE BLED SCIENTIFICALLY

For every dollar the United States spends, a dollar must be collected from taxation or the imposition of tariff duties. We have provided by bond issues for supplying about seven billions of these expenditures, but we will provide by taxation this year in the United States more revenue than has ever been collected in one year in any country in the world. We will raise over four billions of dollars in this manner this year. Every industry and every business in the country will have to pay its share of this tax, and it is this particular subject I shall discuss. As I have said, we must provide more money by taxation this year than we have ever done before. In the succeeding years, if the war continues, this taxation must be increased. We should go very slowly and deliberately in imposing this taxation. We must not exhaust or harm any source of supply we shall tap, but we must so scientifically levy the taxation necessary to meet the unusually heavy requirements of the Government that every industry and business in the country, while bearing its fair share of the burden of the cost of the war, will not be injured and will be able in the future to pay the increased taxation which must be levied. If the war continues indefinitely, the country may be bled white to pay the cost. This burden is unescapable, but if we are bled scientifically it may lead to the purification of our blood. If we are bled wrongfully, it may lead to a pernicious anemia.

The Government cannot by taxation or restrictive legislation harm any part of the industry of the country without indirectly harming the whole industrial structure. The industrial fabric of the United States is not made up of a thousand and one separate and distinct units, but is one great powerful machine of which every corporation and business in the country is a component part, each dependent to some degree on the other. This great industrial machine is so delicately assembled that you cannot oil the smallest wheel without indirectly speeding up the entire machine, and you cannot injure or restrict one little wheel without indirectly impairing the efficiency and productiveness of the whole machine.

MUST CONSIDER THE FUTURE OF BUSINESS

We must impose extremely heavy taxation, it is true, but, in my judgment, there are vital reasons why we should not take all the income of the country and why we should not take all the surplus revenue earned as a result of the war. No business can exist that never looks beyond to-day. Business must look ahead and see where it is going to end. It wants a terminus in plain view. If it has that terminus, it has confidence, and the result is good business conditions in the country. In business there are years of plenty and years of almost complete failure. In the years of plenty, the frugal and prudent producer lays aside a part of his earnings for the development of his plant, the improvement of his machinery, and for other purposes which will promote the efficiency of his undertaking, in order to enable him to maintain some payment on the capital invested in years when a return is not earned. It is of vital importance to an industry to be able to pay regular dividends. There are a great number of investors in this country who depend almost wholly on the income they receive from such sources. They will not put their money into an industry which pays large dividends one year and does not pay any for three or four years, as would be the result if the manager lacking in prudence were to pay out all of his earnings one year; but if he does provide for the condition I have described, the Government, unless it wants to kill the goose that lays the golden egg, must in levying its taxation leave the industries of the country enough of their surplus earnings to make these necessary provisions for the future. Any other policy on the part of the Government is short-sighted and unfair.

I do not believe we will ever reach that sublime state where we can love our enemies, but as much as we hate the Prussian Military Machine we are willing to acknowledge its high state of efficiency. It is the greatest military machine the world has ever known, but its efficiency and effectiveness have been solely dependent on the economic policy followed by Germany for the past thirty years. If it had not been for Germany's protective policy, under which industry and agriculture have been protected, fostered, and promoted to their greatest productiveness, her armies would have been compelled to surrender long ago because of lack of food and material. For the last two years at least, Germany, although unable to obtain supplies from without her borders, has been able to maintain her armies in the field, maintain her industrial fabric, and supply her military and civil population with food. It seems to me that we can learn a great lesson from Germany's industrial policy. Instead of wasting time and energy in enacting makeshift legislation to tide the Government over until another year, Congress should work out a definite and scientific financial scheme to provide for paying the cost of this war, a scheme which will not be discriminatory, unfair, discourage initiative in business, prevent development of resources and industries, or favor or injure certain classes or groups. Unless we adopt such a course we are going to adversely affect American progress, discourage American efficiency, and in the long run reduce American wages.

Protection, Preparedness and Prosperity

The American Tariff Policy Equipped Us for Our Great Part in the War

By *Thomas O. Marvin,* Secretary, Home Market Club

THE United States faces the most stupendous task in its history. It has entered the contest against the most highly organized empire in the world, an empire trained to cooperative effort, aroused to united endeavor, and steeled to the sternest sacrifice.

In the task to which we have set our hands the last ounce of moral and material force that we possess must be utilized. We, too, must learn to coordinate the effort of the nation, employ to the best advantage all our resources and face unflinchingly the strain and sacrifice of a long and bitter war.

OUR DEBT TO INDUSTRIAL EFFECTIVENESS

Fortunately for us the great sweep of national development has carried us to a high place among productive nations. Because the intelligent statesmanship of our early years deliberately planned for a broad and diversified development and safeguarded our growing manufactures with protective legislation, we can throw into the scales of war an industrial effectiveness that makes the United States, in this critical hour, the decisive element in the contest and the hope of a war-worn world.

When at last the fateful step was taken that arrayed the United States on the side of the heroic European nations that were battling for the liberty of the world, no one doubted that the response in men would amply meet the need of the occasion, great as it might prove to be. No one doubted that the call for men to rally around the flag would meet with enthusiastic response wherever American ideals are cherished and wherever the love of liberty still lives. When the call came every city, town and hamlet gave of its best manhood that the honor and integrity of the Nation might be preserved and that the world might not fall a victim to the overlordship of the Teutonic Powers. Two million men under arms are our answer to the call, and if need be five million, ten million or fifteen million more will respond.

And all of the millions and billions of dollars that will be needed will be forthcoming, too. The staggering cost of the war will be provided freely and ungrudgingly.

INDUSTRIAL STRENGTH SAVED COUNTRY ONCE BEFORE

Equal, as we are confident of being, in men and money for the task before us, we are able, too, to supply the material needed to win the war. Owing to our national policy of encouraging industry, of placing, as General Grant put it, the factory beside the farm, we have become the world's greatest manufacturing nation. Yet in the tariff debates of the First Congress a representative argued that although manufactures are useful establishments, "our circumstances do not admit us to become an extensive manufacturing country." At a later Congress one stubborn reactionary protested against encouraging manufacturing because the occupation "has a tendency to degrade and debase the human mind." Today when the destinies of the world depend upon the output of our steel mills, it seems incredible that Mr. Lee of Virginia argued in our First Congress that no gentleman

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How to Win the War

Relation of Business and Finance to the Gigantic Struggle

By *Frank A. Vanderlip, President National City Bank of New York*

THIS war is the biggest job America ever faced, or is ever likely to face. It is a job so big that none of us has walked around and measured it. We have only got some little views of the mountain that is ahead of us. We are just beginning to understand what it means to go to war in the modern sense and what it means to prepare America for war.

We knew we were unprepared. I don't know whether we knew how thoroughly unprepared we were. Our unpreparedness was complete. But when we come to make an inventory of what is necessary; when we come to understand what a gigantic task it is to equip an army; when we come to know something about modern warfare and understand that it is a matter of equipment as much as it is of men; then we begin to see something of the size of this undertaking.

We are apt to measure things with the yardstick of the dollar—this money value of things. We have seen this unprepared country go to war and we have applauded the act. We have seen the Departments come forward with their estimates of what was necessary to equip this army, and we have seen Congress appropriate for expenditure this fiscal year nineteen billion dollars.

Do you know what a billion dollars is? I don't. I have been used to handling million dollar units a good deal. We know what a million dollars is pretty well. We can picture what sort of a building, how much of a shop, what kind of a store a million dollars represents. Some of us have had to do with ten million dollar transactions. I know pretty well what it means to float a ten million dollar bond issue. I have a little idea of how much railroad track, how much equipment, how many locomotives you could buy for ten million dollars. Once or twice I have had to do with hundred million dollar transactions, and then we did have a five hundred million dollar transaction. We have been growing to this thing by degrees. But suddenly we have this new unit, a billion dollars, and we multiply it by nineteen. Congress did not have any apprehension of what nineteen billion dollars meant. It appropriated patriotically what was asked for. The Departments did not have any conception of what nineteen billion dollars meant to spend. The Treasury certainly had no experience in raising any such sums. But they went at it, and they went at it under wise guidance, and they have raised a vast amount already. They made such a success of the first two billion dollar loan that three billions were subscribed; such success of a three billion dollar loan that four billions six hundred millions were subscribed.

We are coming to see, however, that when Congress appropriates money there is something else to do. We have to raise it, and then we are coming to see that when we raise money there is something else to do: we have to spend it. And so we are beginning to measure this task, not in dollars, but in things; for it is things that we have got to convert these dollars into. Nineteen billion dollars! It would make a ring of twenty-dollar gold pieces around the Equator, one lying next to the other. It is three times all the money there is in the United States. Every dollar that this Government has spent from its foundation, down through all the wars, through all the days of peace, all it has spent for pensions, for the Panama Canal, for constructing public buildings —every expenditure that it has made from the first days of Alexander Hamilton in the Treasury down to the beginning of this fiscal year—foots twenty-six billion three hundred million, and now we are going to spend nineteen billion dollars in a year! The value of all the railroads in the country—tracks, terminals, equipment, locomotives, cars, everything—is less than nineteen billion dollars. What would you think if we had to reproduce the railroad system of America in a year? It would be something of a job, wouldn't it?

Now, of these nineteen billion dollars, you may say at once, not every dollar is to be spent for Government purposes. Why, we are loaning six billion dollars of that to the Allies. Yes, but for what? To spend for things here in the United States. It is true we are spending some of that for food; something for the products of the farm. We are using a little of it to pay the soldiers. But in the main, that nineteen billion dollars is to be spent for the products of the workshops, for the result of manpower, for what we can turn out with the organized industry of this country.

This brings us to the question: What can organized industry do? How big is the industrial plant of this country? Three years ago, the year the great war began, the Census Department undertook to find out just what the value of the manufactured products of America was, and they found that they were worth for that year $24,300,000,000. This year they would be worth a good deal more. We have grown; we have expanded our industries; we are working harder; more men are at work; prices are higher. But suppose that figure is $30,000,000,000 or $35,000,000,000. Put in juxtaposition with whatever figure you may set as the capacity of the workshops this demand for $19,000,000,000 worth of things, and what will your conclusion be? It will be that the Government is going to fail to do its job, or you and I are going to call on the workshops for less than we have been calling upon them for.

That is no theory; it is the inevitable conclusion from two facts: our capacity and this demand. If we are going to continue to call on labor, to call on the supply of raw material, to take up shop room, to make those things that we have been in the habit of asking for; if we are going to continue to demand the things of luxury, of comfort, of convenience that we have been in the habit of demanding, the Government is going to fail to do this job, and you and I are going to paralyze the blow when the Government comes to strike it, because it will not have equipped this army; it will not have equipped it as it should.

Now, that view makes the thing pretty personal. It begins to show us that we have some relation to this job; that the Government is not a thing apart that votes war, that sells bonds and that fights the battle out. This is a democracy. We are part of that Government, and never before was it so clear that the responsibilities of citizenship come directly to us and demand of us sacrifice; demand of us that we so handle our personal affairs that we do not get in the way of the Government; that we do not become competitors with the Government for those things that the Government must have.

I tell you, we have come to a time when we have got to weigh the expenditure of dollars in a new scale. It is no longer a question of whether we can afford to buy a thing that we want. The question now is: Can the Nation afford to have us buy it? We have got to look at our personal affairs from a national viewpoint. We have got to see that we have a duty to society, a duty to the Nation—indeed, a duty to the world—in the conduct of our personal affairs. When we spend a dollar we put it into either one pan or the other of a balance. If it goes in on the side of unnecessary expenditure—if by spending it we employ labor unnecessarily, consume material, needlessly take up room in a workshop—that pan will go down and the pointer will turn away from victory. If we put it in the other pan of the scales—if we loan it to the Government—we do two things: We give the Government credit and we give the Government room in the workshops to get its job done. We release labor that we have been commanding; we release material. We put a weight in that other pan that turns the pointer toward victory. So we have that personal responsibility—that necessity for weighing from the national point of view our expenditures.

There are three things you can do with a dollar: you can hoard it, you can spend it, or you can invest it. Now, a hoarded dollar is an idle dollar, and today, with capital needed, it is a drag on a community, just as an idle man is a drag on a community. An idle dollar is a slacker. But there is something worse than a slacker. A slacker is not doing anything actively to defeat the Nation's purposes. But a dollar that you spend needlessly, a dollar that employs labor or consumes material in competition with the Government, is an ally of the enemy; it is a traitor dollar.

We must think constantly what is the Government's job; we must recognize how big that job is, how enormous it is compared with the capacity of our workshops. We want to build a billion dollars' worth of aeroplanes. We want to spend two billion dollars on ships. We have appropriated one billion eight hundred millions for ammunition. Why, in this war, which will be one in which the transportation is done in the main by automobile trucks, we have ordered 136,000 horse-drawn vehicles. That would make a procession eight hundred miles long. All this gives just a little glimpse of the endless things we have to do. It gives us a little conception of the draft we are going to make upon manpower, upon raw materials, upon the workshops, upon the organized industry of the country. And, remember, we have taken a million eight hundred thousand men out of industry and have put them into camps. Some of them, too, have not got overcoats yet; a lot of them have wooden guns, and some of them haven't even wooden guns. And, when we buy things that we can get on without, we are postponing the day when they will have the overcoats. When we buy things that are unnecessary, we are postponing the day that these ships will be ready; that they will be manned; that they will begin to take any great number of our men to the fields of France. And it is only when they are gotten there and there are ships enough to keep them supplied, and supplies enough to fill those ships, that we shall begin to be heard from in this struggle.

WAR SAVINGS CERTIFICATES

Now, these War Savings Certificates; what are they? They are little postage stamps—that is about what you know of them, I suppose. I believe that among all the wise things that the Secretary of the Treasury has done—and I think he has done many wise things—his advice to Congress to give him legislation to issue War Savings Certificates was the wisest, the most far-reaching in its results, of anything that he has done.

A War Savings Certificate is a piece of paper upon which is printed the promise of the Government. It is without value except as that value is measured by stamps that are attached to it. Those stamps will all mature Jan. 1, 1923. It is our aim to have them on sale at more places in the United States than any other single article.

Now, let us see what an investment in War Savings Stamps is like. You pay this month or next $4.12 for one of these stamps. When you buy it, it is attached to a certificate that has on it a place for twenty stamps. Your name is written on the certificate, and after you have attached your first stamp your rights are as complete as they will be at any time, should you fill the certificate or add any number of stamps less than twenty. Now, what are those rights? If you hold the certificate for five years you get five dollars from the Government for every stamp attached. That means four per cent compound interest, compounded quarterly. But the buyer may say: "What if I want my money before?" All right; you can have it. The idea is that men are making this loan to the Government for five years, but if in the exigencies of life the holder of one of these certificates needs the money, he can go to any one of the fifty thousand postoffices in the United States, and, on giving ten days' notice, get back the money that he has paid plus one cent a month increase, an increase equal to three per cent simple interest.

This is the simplest, the most convenient, and surely the safest method of saving that was ever offered to a people. It is not necessary to go to any particular bank, or even to a postoffice. You can buy these stamps anywhere. You can cash them at any postoffice. Suppose you lose this certificate. It is of no use in the hands of anyone but the man whose name appears on it. If an honest person finds it, all he has to do is to drop it into the nearest postoffice box, without postage or further address, and the postoffice will return it to its owner. If a dishonest person finds it, he has to give the postoffice ten days' notice that he is going to commit forgery—which he is not likely to do. So, you see, you are pretty safe. But suppose it should be burned up or otherwise irretrievably lost; then you would be out of pocket. But the Government will even insure you against that, if you will take a little trouble. You can take this certificate to any postoffice and without cost have it registered; have the stamps canceled. After that you have to deal with the one postoffice, and when you add further stamps you have to have them canceled too. You then have something that is equivalent to a passbook. If you lose it you have only to establish your identity and your loss is made good.

For people who find $4.12 a considerable amount the Government has issued

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New and Unusual War Textiles

Some May Meet Permanent Demand—War Needs Force Readjustment of Production of Textiles

IT was a subject for joking in the cotton goods trade last summer, when a New England manufacturer reported that he had a war order for a million pieces of cotton flannel; the pieces turning out to be a few inches square and to be used for gun-wipers. The story aptly illustrates both the enormous volume of the demand for war textiles and the unusual character of much of it. Manufacturers are just commencing to adjust themselves to the large volume of the Government's textile needs, but they have not yet reached the point where the novelty of some of the unusual requirements has worn off. Nevertheless, many farsighted manufacturers appreciate that some of the new textiles demanded by modern warfare may make for themselves a permanent place in the market. The cotton webbings that are being substituted so extensively for leather strappings, the innumerable new uses made of cotton duck, and the cotton airplane cloth, are some of the new textile fabrics, or new uses of textile fabrics, that are likely to survive.

(Photo. Kadel & Herbert)

COVERING THE PROPELLING CHARGE OF A BIG GUN WITH SILK CARTRIDGE CLOTH

REMARKABLE READJUSTMENT OF INDUSTRY

The manner in which certain branches of the textile industry have been readjusted to meet the unusual emergency demands of war is no less remarkable than the volume of the demands. The insatiable requirements of the army and navy for cotton duck soon exhausted the capacity of this branch of the cotton industry, and duck for tentage, tarpaulins, buckets, bags and dozens of other uses, is now being made by tire cloth, carpet and even silk mills. The capacity of carded woolen mills has also been drained by the Government, and carpet mills are now helping out with the production of knitting yarns and blankets. Some of the silk mills have had to help with the weaving of cartridge cloths, and it is not impossible that some of them will soon be producing cotton-warp worsted shirtings. A year ago the production of wool hosiery and underwear was hardly large enough in this country to warrant its designation as a separate branch of the knit goods industry, but to-day it has assumed decided importance, and there is not the slightest doubt but that a considerable proportion of this broadened demand for wool-knit goods will remain of a permanent character. Add to the machine knitting the enormous amount of hand knitting that is being done by our patriotic women and we have a wool-knit goods industry of imposing size.

SOME OF THE NEW WAR TEXTILES

Not all of the fabrics that may well be classed as new war textiles are of an unusual character. Some of them, like knitted and woven puttees, leather substitutes, gas-mask cloth and camouflage cloth, simply involve new uses of old fabrics, but to adapt them to their new uses some of these fabrics have undergone radical modifications. The use of mercerized cotton for airplane cloth, and of narrow cotton webbings for leather strapping are entirely new developments in this country. Linters have long been used for cotton, but never in the enormous quantities required by modern warfare; so enormous, in fact, that it has stimulated a record-breaking production of this short fiber from one of the smallest cotton crops of recent years. The use of silk noils for cartridge and shell cloths is not novel, but it is a new experience to have the country's total production of silk noils and of a large part of its spun silk utilized for such purposes. The enormous increase in demand for absorbent cotton, gauze cloths and similar hospital supplies is also a feature of warfare on the present large scale.

WEBBING DISPLACES LEATHER STRAPPING

One of the most important of the new war demands affecting the textile industry, and one that may have large trade possibilities of a permanent character, is the extensive substitution of cotton webbing for leather strapping. This idea was borrowed evidently from the British army, for such fabrics have been used by the British for belts since 1908. The British have also made extensive use of wide webbings and duck for haversacks, pouches and stretcher coverings, and similar uses are being made of the same fabrics in this country. The scarcity and high price of leather have necessitated these comparatively new uses of cotton ducks and webbings, and similar causes promise to give them a broad and permanent market after the war is over. Some idea of the relative strength of cotton webbing and leather strapping may be gained from the fact that a good leather 3/16 of an inch thick, and weighing 16 ounces per square foot, will have a tensile strength of about 4,200 pounds per square inch; this is but little stronger than cotton webbing of the same width and weight. The webbing and duck actually used are, of course, not so thick or heavy as leather previously used for the same purposes. The webbings used are of a wide variety of widths, weights and constructions, varying from a half inch to six or more inches in width and being constructed of two to ten-ply yarns, usually of counts from 10s to 20s. The following test sheet of olive drab webbing, used by the Ordnance Department, gives a good idea of the variety of these goods and of their construction and strength:

ORDNANCE DEPT. O. D. WEBBING

Grade	Width, in.	Weight oz. per lineal yd.	Total warp ends	Picks per in.	No. Warp yarn	Ply of filling yarn	Tensile strength Warp	Tensile strength Filling
Heavy	⅝	1	59	32	10/5	5 ply	400	...
Heavy	1	1½	89	26	10/5	5 ply	600	...
Heavy	3	2¾	195	30	10/5	5 ply	1,200	...
Light	⅝	.31	83	54	16/2	2 ply	135	...
Light	1	.43	108	54	16/2	2 ply	150	...
Light	1¼	.54	135	54	16/2	2 ply	175	...
Light	1⅝	..64	158	54	16/2	2 ply	225	...
Light	2	.86	211	54	16/2	2 ply	275	...
Light	5¼	2.4	476	54	16/3	2 ply	125	150
Jute gutting	1¼	1.8	112	24	10/3	3 ply	550	...
Jute surcingle	3⅛	1.8	70	11	2 ply	2 ply	200	150

For the first time in the history of warfare the fine-count end of the cotton industry is being called upon in an important way to furnish a variety of fabrics. As has been the case in some other parts of the textile industry, war demands have developed at an opportune time to fill in the gaps made by decreased civilian consumption. At present, comparatively few spindles and looms are employed upon airplane, balloon and gas mask cloths, but if the plans for an enormous air fleet materialize, and we put into the field an army of 3,000,000 men, the demands upon fine-count cotton spindles and looms will be enormous. There is no close similarity between the three classes of fabrics mentioned, excepting that they require combed yarns of comparatively fine count.

CAMOUFLAGE CLOTHS

In the same class may be listed a variety of open work fabrics, such as marquisettes, which have been used as substitutes for mosquito netting and also for camouflage work; they might well be dubbed camouflage cloths. If Washington officials responsible for the purchase of these goods were less reticent about their uses it would probably be found that the major portion of the marquisettes and similar fabrics are to be utilized for overhead and side screens as a camouflage for gun positions and for hiding large bodies of troops. Millions of yards of such fabrics have been utilized by the English and French for this purpose, the top of the screenings being crudely painted in such a manner that aviators mistake them for grass, foliage or earth. The contracts placed in this country since the war started for fabrics of this character aggregate many hundred thousand yards, and, as soon as large bodies of our troops are in action, demands are certain to be very much larger.

Were it not for the fact that Irish and Scotch linen manufacturers are unable to take care of more business for airplane fabrics it is doubtful whether the production of cotton substitutes would have been undertaken. Flax, because of its length in line yarns, and particularly of its strength and lack of stretch, is the fabric par-excellence for airplane wings. Probably it will continue to be used by all of the Allies for the wings of battle and bombing planes, for which extremes of strength are requisite. At all events, the mercerized cotton airplane cloths now being made in this country are destined for use only on practice and scout planes. Some idea of the enormous yardage of airplane fabrics required by the Allies may be gained from the fact that linen looms in Belfast, Ireland, and vicinity are working on orders aggregating 50,000,000 yards, taking the production of nearly two-thirds of the available looms.

THE WAR DEMAND FOR COTTON DUCK IS INSATIABLE AND TENTAGE IS ONLY ONE OF ITS NUMEROUS USES

Two varieties of airplane fabrics are being made in this country; one from 3-80's, combed Sea Island mercerized yarn, weighing 4 ozs. per square yard and having 68 threads per inch in both warp and filling; the strength test for this fabric is not less than 73 lbs. in both warp and filling on a sample 12 ins. long and 1¼ in. wide. Another fabric made of 2-60's combed Sea Island mercerized yarn is of similar construction, but heavier and stronger.

It is estimated that contracts are being placed to meet the requirements for about 26,000 planes, and these have been distributed among four of five New England fine-count mills, most of the mercerizing being done by job firms. Each practice plane requires 170 yds. of

(Photo, Underwood & Underwood)

AT WORK ON AIRPLANE WINGS SOMEWHERE IN THE UNITED STATES

40 in. cloth, or 189 square yards per plane. If all of the fabrics were made of 3-80's, and the contracts extended over six months, they would call for the production of over 150,000 spindles. The life of an airplane in actual use is extremely short and this, plus the large number likely to be required, may demand eventually the production of several hundred thousand fine-count spindles.

Official tests of these new mercerized cotton fabrics prove beyond the question of a doubt that they can be made with a factor of safety for strength several times greater than is demanded by the specifications. Whether this will result in a more general use of such fabrics for all varieties of planes remains to be seen, but it is a possibility. All airplane fabrics whether of linen or cotton are "doped" with a special preparation designed to eliminate stretch. Experiments are also being made to give fabrics a fire-resistant treatment.

Balloon fabrics are made of straight silk, of straight cotton and in cotton and silk combinations. Silk, it may be stated, has proved to be entirely unsuited for airplane fabric, because under tension it soon loses its come-back qualities. Under "fatigue tests" silk and cotton act similarly up to a certain point, after which the cotton yarn or fabric is unchanged, whereas the silk steadily weakens. If it were not for this shortcoming, silk, because of its great strength, its lightness and its long fiber, would make an ideal airplane fabric. A long fibered fabric is of particular advantage for such uses because it is less likely to rip and tear when riddled with bullets.

(Photo. Western Newspaper Union)

A FLEET OF AMERICAN PLANES AT SAN DIEGO, CAL.

A UNIQUE SILK AIRPLANE FABRIC

An extremely unique silk fabric has been developed and patented by Mr. Kaltenbach, of Kaltenbach & Stephens, Newark, N. J., and Allentown, Pa., which may overcome the known shortcomings of silk, and may prove superior to any airplane fabric produced previously. This fabric is built up with narrow taffeta ribbons, a sufficient number of ribbons to form the desired width being laid side by side, while ribbons of similar construction are then interlaced with the ribbon units running at right angles to those in the bottom fabric; in other words, it is a plain basket weave, the units being ribbons instead of yarns; these are then basted on a plain cloth and subsequently stitched on a sewing machine, with the effect that, for a fabric made of ribbons an inch wide, there is a resultant fabric made up of inch squares. A bullet fired through such a fabric will produce a tear that will extend no farther than the sides of any given square. Such a fabric will stand a "fatigue test" as well as any linen or mercerized cotton fabric, and it is stated that it is 50 per cent lighter and about 100 per cent stronger than the best mercerized cotton airplane cloth.

Naturally, in the equipment of troops, woolen fabrics play the most important part. As a matter of fact, the great bulk of purchases by the Quartermaster's Department through the Committee of Supplies of the Council of National Defense and the Bureau of Supplies and Accounts has been of wool products. In the operations of Government purchasing, the Quartermaster's Department of the army has been the big factor as far as wool garments are concerned. Other departments, such as the Navy, Marine Corps, the Hospital Corps, the Aviation Corps and the Red Cross, while adding materially to the total, are not to be compared in the volume of business done with the Quartermaster's Department.

PRINCIPAL FABRICS BOUGHT

The large volume of woolen business placed for the army has centered round four fabrics, namely, 8½ to 9-ounce shirtings, 16-ounce all-worsted suitings, 30-ounce melton overcoatings and blankets. All these are khaki-color, a change which dates back a number of years to the time when indigo blue was the general shade demanded for the army. This refers to both officers and privates.

MODIFICATIONS OF FABRICS

While from a general standpoint before-the-war fabrics have continued to be taken since this country has entered into the international struggle, various causes have contributed to bring about a modification in construction which amounts to practically new cloths being demanded. Before the war commenced all army specifications called for all-wool fabrics; there was no deviation from this rule and there was a decided antipathy to the word shoddy in connection with fabrics for the use of Government troops. Officials of the army, in much the same way as civilians, have had it impressed upon them that the use of shoddy or cotton in a fabric interfered very seriously with the warmth and durability of the cloth. As a consequence, although repeated attempts had been made to demonstrate that a judicious admixture of high-grade shoddy of a certain percentage would interfere in no way with the wearing qualities or the desirability of the woolen fabric, nevertheless it was impossible to persuade those who had in charge the purchasing of army equipment that such was the case. With the entrance of this country into war there was immediate talk of a change in the quality of goods for the Quartermaster's Department, but it was not for some time that the subject would even be considered. It was probable that those officials who had a technical knowledge of wool manufacture were satisfactorily convinced that shoddy would not be deleterious if used properly, but they feared the criticism of civilians and particularly of the public to whom this word was anathema.

(Photo. Western Newspaper Union)

ARTILLERY MEN EQUIPPED WITH GAS MASKS. THE CLOTH IS WOVEN IN NEW ENGLAND MILLS

When, however, it became evident that the wool situation was to be acute, not only from a price standpoint, but also on account of scarcity and with the propaganda so general for conservation the arguments in favor of a cheaper material were listened to, with the final result that certain adulterants were incorporated in the specifications, although in the case of shoddy officials were very careful to see that a more euphonious term was used and in its place, after long consultation with authorities in the trade and after innumerable suggestions the term re-worked wool was generally adopted and incorporated in the specifications. In the case of the shirting, the conservation policy resulted in the

ENLISTED MAN'S FIELD EQUIPMENT

adoption of a cotton-warp fabric in the place of an all-wool cloth formerly used. The 16-ounce all-worsted suiting is the only fabric used by the soldier in which there has not been a change in specifications permitting the use of adulterants. Officials decline to consider any substitutes for this fabric in view of the hard and constant wear to which the suiting is subjected. This is especially true of trouserings.

EMERGENCY PURCHASES

The statement that no suiting fabric other than all-wool was considered is true as far as any purchases with which the co-operative woolen committee was concerned, although it is intimated that there were certain emergency orders placed in which an inferior cloth was substituted. This brings up the point that has formed the subject of considerable discussion, not only in official but trade circles regarding the efficiency and excellence of fabrics that have been furnished the War Department. The

(Continued on page 437)

In Our Country's Service

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1—Brig.-Gen. L. D. Tyson, Commanding Division at Camp Sevier, Greenville, S. C. [President Knoxville Spinning Co. and Knoxville Cotton Mills, Knoxville, Tenn.].

2—Col. John P. Wood, connected with Quartermaster's Department, Washington, D. C. Transferred from command of 103d Engineers [Wm. Wood & Co., Pequea Mills, Philadelphia].

3—Capt. Franklin D'Olier, Quartermaster Corps with Expeditionary Forces in France [Franklin D'Olier & Co., Philadelphia].

4—Capt. Stuart W. Cramer, Jr., U. S. Cavalry [Stuart W. Cramer, Charlotte, N. C.].

5—2nd Lieut. Wesley G. Greenwood, Ordnance Reserve Corps [Barbour Flax Spinning Co., Paterson, N. J.].

6—1st Lieut. H. K. Webb, Coast Artillery Corp, now with Anti-Aircraft Artillery Expeditionar[illegible]es in France [Charles J. Webb & Co., Phila.].

7—Maj. W. M. Schwartz, Inspector, Ordnance Department [Vice-President and Manager Philadelphia Textile Machinery Co.].

8—Col. Quincy A. Gillmore, 112th Heavy Field Artillery [Coffin & Gillmore, Philadelphia].

9—Lieut. Nathaniel F. Ayer, U. S. N. R., Commanding Officer Naval Radio Station, Harvard University, Cambridge, Mass. [President Farwell Bleachery and Farwell Mills; Treas. Nyanza Mills and Cynthia Mills].

In Our Country's Service

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1—Col. Millard D. Brown, 109th Infantry [Brown & Bowers; also Treasurer Continental Elderdown Company, Philadelphia].
2—1st Lieut. G. D. Riedel, Aviation Corps [Charles J. Webb & Co., Phila.].
3—Ensign Horace T. Greenwood, Jr., U. S. N. R. [Globe Dye Wks., Phila.].
4—Sergt. Rutledge S. Goldthwait, Coast Artillery [Pennsylvania Textile Co., Central Falls, R. I.].
5—Arnold Kreusler, 104th Machine Gun Battalion [W. H. Duval & Co., N. Y.].
6—2nd Lieut. C. Harland Lawrence, 303d Infantry [Winthrop Cotton Yarn Co., Taunton, Mass.]
7—Chief Yeoman Robert B. Lehman, U. S. N. R. [Wm. H. Richardson, Phila.].
8—Harry Jefferson, Aviation School, Princeton, N. J. [Secretary American Textile Banding Co., Philadelphia].
9—Lieut. W. C. Steele, Quartermaster Corps [Smythfield Export Co., Phila.].
10—Lieut. Harry A. Street, Quartermaster Corps, Equipment Division [John F. Street & Co., Providence].

The Future of Manufactures in Our Export Trade

Responsibility for Retaining Leadership of United States in Export Trade Is Enormous

By *O. P. Austin*, Statistician of the National City Bank

THE manufacturers of the United States will at the end of the war face a very grave responsibility, both to themselves and to the country. That duty will be to determine whether the United States shall retain its place among the leaders in world export trade.

We are no longer in position to retain our rank as an exporter of foodstuffs, for which the world has sent its ships and money to our doors. With all the recent urgency for self-denial in order that we may send foodstuffs to our Allies in Europe the quantity of food being exported has steadily fallen, and will continue to fall. Exports of wheat in the ten months of 1917 are about 98 million bushels, against 180 millions in the same months of 1915. Corn, of which we have large quantities, we cannot persuade our European friends to eat, and we seldom export as much as 2 per cent of our enormous crop. Mr. Hoover pleads for meatless days in order to be able to send a surplus of meats to the boys in the trenches, and his pleadings are helped by the high prices which our dealers ask, yet the quantity which we were able to squeeze out in the fiscal year 1917 was less than one-half that which we voluntarily exported in the form of beef and beef cattle a decade ago. The Department of Agriculture reports the number of cattle, other than milch cows, in 1917, only 41 millions, against more than 51 millions a decade ago, and the number of sheep but 48 millions, against 62 millions in 1902. Stimulate our cotton production as we may, the share of our product which we sent out of the country in 1917 is less than 45 per cent, against an average of 66 per cent a few years ago, and we have no other class of raw material to spare for exportation. The share which foodstuffs form of our exports has fallen from more than 50 per cent to less than 20 per cent, and raw manufacturing material, which formed in the 70's over 50 per cent of the exports, was in 1913 but 30 per cent of the total exports.

FOOD EXPORTS DECREASE RAPIDLY

The day of our activity as an exporter of foodstuffs and raw material other than cotton is past. The special pleadings of the Government, coupled with our own self-denial, may possibly keep up our meat and wheat exports at their present level until the end of the war, but no longer, and the reaction which will follow the long strain upon our resources in that line will bring the exportable surplus of material of this character to an even lower point than before the war, when we were exporting less than 20 per cent of our wheat and 2 per cent of our corn. The value of our meat and live cattle exported has fallen, even at the present high prices, to but about one-half that of a few years ago. Food exports from the United States fell off $100,000,000 in the period between 1900 and 1914, while food imported into the country increased more than $250,000,000 in the same time, and the value of foodstuffs imported in 1914 was actually more than the value of food exported in that year. Foodstuffs formed 55 per cent of our exports in 1880, 42 per cent in 1890, 22 per cent in 1910, and 18 per cent in 1914, the latest normal year. With all the appeals and high prices offered our farmers in 1917 they produced only about 6 bushels of wheat for each citizen of the United States, while 20 years earlier the product was 10 bushels per capita.

The fact is that we have passed the stage in our national history in which we can have any considerable surplus of natural products other than cotton. Our population doubled in the period 1880-1915, and at the same rate of growth will be 200 millions in 1950. We may be able to so intensify the production of our acres as to supply bread and meat for this increased population, but we shall have to bring from abroad vast quantities of other material for food and manufacturing. We have prided ourselves upon the fact that our exports far exceeded our imports, but the fact is that our imports in 1917 were more than the total exports in 1914, the latest normal year. Imports have doubled in value since 1909 and trebled since 1901. And this is not due to war conditions, for they more than doubled in the ten years preceding the war. Our imports of tropical and subtropical material into continental United States in 1917 were more than $1,500,000,000.

MANUFACTURED EXPORTS MUST INCREASE

How are we to pay for this vast and constantly increasing quantity of material which we are requiring from abroad? Clearly, there is but one answer to this question, we must increase our exportation of manufactures. And why not? We have since the war shown our ability to increase our output of certain lines of manufactures at a tremendously rapid rate. We doubled our exports of manufactures in the eight years preceding the war, and then nearly quadrupled them in the three years of the war. The value of our manufactures exported in 1917 was about four times as much as in 1914 and nine times as much as in 1900. We astonished the world, and in fact astonished ourselves with the ability we have shown not only to expand our exports at a startling rate of increase, but so to transform our factories as to make with phenomenal speed and accuracy classes of material entirely different from those which the factories were built to produce.

And this discovery of an ability to make goods to suit the demands of special markets and turn them out promptly and in good form may be the most valuable lesson of the war and may be of much greater money value to our manufacturers than all of their great war profits. Prior to the war munitions formed but an extremely small factor in our manufacturing and exportations, and this was true also of chemicals, firearms and many other materials of which the exports now run into the hundreds of millions. Chemicals exported in 1917 were seven times as much as in the year before the war, firearms 27 times as much, and explosives 120 times as much as in 1914. In a comparatively short time we so transformed our factories from the production of peace materials to those of war as to increase the exportation of chemicals, firearms, explosives and empty shells from 37 million dollars in 1914 to 1,346 millions, or 36 times as much in value, in 1917, and this did not apply to war munitions exclusively, for iron and steel manufactures increased from $250,000,000 in 1914 to $1,129,000,000 in 1917. Do not all these wonderful developments in manufacturing for the export trade show that the manufacturers of the United States have undreamed-of ability to buckle on the sword and go out and fight for world supremacy in the export trade in manufactures, just as we have formerly held that rank in the exportation of natural products?

What are the classes of manufacture in which we are best equipped to make the fight for expansion of our trade? There are two ways of answering that question, first by determining the kind of manufactures which the world buys, and second by finding out what of these popular classes of manufactures we can successfully produce in competition with those countries which have been supplying them.

The classes of manufactured goods which the world chiefly buys are cotton and woolen manufactures, iron and steel, machinery, agricultural implements

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Our Textile Machinery Export Trade

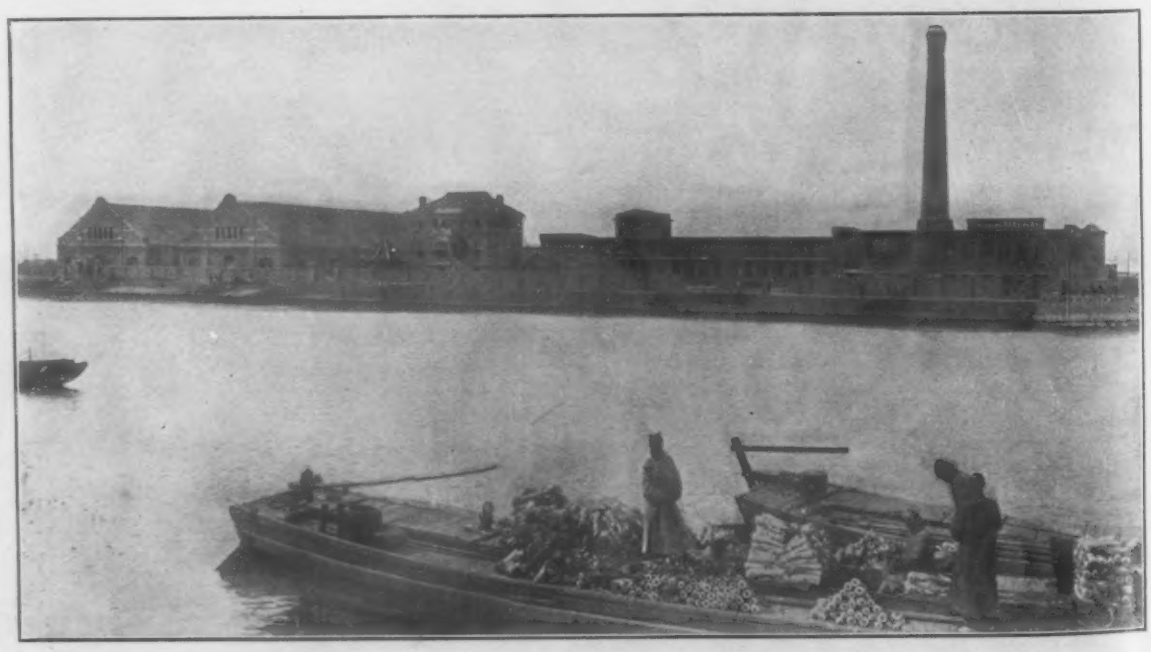
A New Business Stimulated by War—China and Japan the Largest Buyers

THIS country has never been regarded in world trade as an important factor in the textile machinery business. England has held the premier position as a producer and exporter of this class of machinery ever since textiles became a factory industry. Germany and France have given her considerable competition in certain lines, but their combined exports have fallen far short of those of Great Britain. Until 1916, the only textile machinery exported from this country was of a special character. Since the war started a steadily increasing part of the equipment of English and French machinists has been taken for war uses, and the decrease in England's exports of textile machinery has been fully 50 per cent; the total for the six months ending June 30, 1917, being only 26,155 tons, valued at about $10,000,000. The value of these exports is not much smaller than for a similar pre-war period owing to the enormous advance in machinery prices, these frequently being 200 to 300 per cent higher than in 1914.

PART OF ENGLAND'S LOSS IS OUR GAIN

It was not until last year that our textile machinery builders commenced to feel in a large way the foreign demand due to the inability of England, France and Germany to supply the needs of textile manufacturers in other lands. Within the year 1917 domestic builders of cotton machinery alone have filled or booked orders aggregating a value of about $5,000,000, this covering about 350,000 spindles and complementary machinery. The bulk of these orders have come from China and Japan and all but 50,000 spindles are said to have been furnished by one firm, the Saco-Lowell Shops. While comparatively few of the foreign contracts have called for any-

(*Continued on page* 163)



AN AMERICAN TEXTILE MILL IN CHINA. PLANT OF YU YUEN TEXTILE CO., LTD., TIENTSIN

War Testing of Textiles by Bureau of Standards

Valuable Research Work on New Fabrics
Description of Improved Testing Methods

By *E. Dean Walen,* Chief of Textile Department, Bureau of Standards, Washington, D. C.

THE Bureau of Standards of the Department of Commerce was established in 1901 to serve the government and the people, and it was deemed advisable to establish, among many other lines of an investigational nature, a section devoted to the determination of the properties of textile materials and the factors influencing those properties.

In its relation to the government the section has, upon request, supplied information regarding the structure and design of fabrics which would be most efficient for the particular use for which they were intended. This information is usually supplied in the form of specifications for the purchasing and for the adequate inspection of such materials. These activities have been confined principally to the new military fabrics.

The testing and inspection of the delivered material has been confined to the settlement of disputes which have arisen between the manufacturer and the government, and to the materials purchased by the General Supply Committee, the Post Office Department, and the Indian Office of the Government.

PUBLIC ACTIVITIES OF PLANT

The relation of the section to the people has been much the same as to the government. Upon the payment of a nominal fee, tests are made upon submitted material, according to the generally accepted practice or according to any specific method which might be desired. It is usually desired that the party submitting the sample state specifically the tests wanted and the terms in which the report should be given. When no specific information is given, the bureau reserves the right to make whatever tests it deems advisable, considering the use to which the fabric is to be put. The information regarding methods of tests, their value and factors influencing the results is supplied, whenever feasible, free of charge.

WEST LABORATORY, CONTAINING TEXTILE DEPT., BUREAU OF STANDARDS

Several years ago the bureau adopted the policy of holding an annual textile conference with the view of stimulating interest in obtaining exact information regarding the properties of textile materials. The last conference was very interesting and instructive, and it is anticipated that the proceedings can be published as soon as the urgent needs of the military can be satisfied.

It is further anticipated that the impetus given the need of textile testing during the present crisis will have the effect of making the section of more value to the government and general public than heretofore.

In order that the reader may have a more comprehensive view of the nature of the work, it is thought advisable to discuss briefly the methods of determining the properties of textile material and the value attached to the determination of these properties.

METHOD OF ANALYSIS

The conventional analysis of a textile material of a fabric nature has been to determine, by dissection, the weave structure, count, twist and ply of yarns, and the kind of fiber used. This procedure is usually carried out in the customary commercial manner and there is no need for amplification, excepting as these determinations apply to particularly exacting conditions, such as are attendant upon the settlement of controversies; in such cases more careful measurements of the values involving weight and length are made, as will be described later.

The properties of textile materials may be divided for purposes of clarity into three classes: I, physical; II, microscopical; III, chemical.

I. PHYSICAL PROPERTIES

It is highly desirable that the physical properties of textile materials be determined from specimens whose moisture content has reached a state of equilibrium with that of a constant and known atmospheric condition. The reason for such a procedure is justified when it is considered that all animal and vegetable matter absorbs moisture in varying amounts, depending upon the kind and condition of the fibers and the atmospheric condition. The moisture content has a very marked effect on the absolute value of its other physical properties.

The method used consists of exposing the material in an atmosphere of 65 per cent. relative humidity and 70 degrees Fahrenheit (which may be considered as a standard atmosphere) for a period of about three hours, and testing at the end of that time in the same atmosphere. This particular condition of atmosphere was chosen because it is an average of a number of years for the Atlantic coast states. For the more exact results, successive weighings are made until the samples show no further change in weight. At the end of that time they are essentially in equilibrium with the atmosphere.

For practical purposes it is feasible to test at any degree of humidity and temperature, provided these values are corrected to approximate the conditions of a standard moisture content. It is very difficult to correct these values with a desirable degree of exactitude. The objection to this procedure is that the ability of different samples to absorb varying amounts of moisture is a distinct characteristic, and that any method which does not allow the material to take on moisture according to its own law, eliminates that inherent property and its attendant effect on the other properties.

ASCERTAINING WEIGHT

The weight is ascertained by exposing several samples of convenient size, and representative of the entire piece, to a standard atmosphere for a sufficient period and weighing on a balance having the requisite sensitivity. It is customary to weigh on an analytical balance or especially calibrated balance of the same sensitivity.

LENGTH DIFFICULT TO DETERMINE

The length of a yarn or fabric is rather difficult to determine, as, presumably, the true length is that length when the material is perfectly straight and under no tension. The commercial method of reeling yarns and measuring fabrics is usually followed.

For the more exact measurement of the length of yarns, the following method is used: The yarn is submitted to constant increments of loads, and the extensions plotted against the load necessary to produce the stretch. It is assumed that the yarn is straight when this curve follows a straight line ratio, and the length under no tension or load is obtained by prolonging this portion of the curve to intersect the no-load coordinate. This gives the length of the yarn when straight and under no tension.

This method is particularly applicable to the accurate determination of "crimp." The term crimp is defined as the difference in length between the fabric and the yarn when removed and perfectly straight. The usual method of determining crimp is to stretch the yarn until it appears to be straight. The

(*Continued on page* 167)

How War Strategy Affected Textiles

Novel Uses for Textiles in Present War—
The Vast Quantities of Textiles Required

By *J. A. Hunter, Regular English Correspondent to* TEXTILE WORLD JOURNAL.

EXPERIENCE gave some warrant for thinking that modern wars differed from each other in their textile aspects rather in the quantity than in the quality of the goods demanded. Knowing the climate to be fought in and the probable number of the men engaged, a military administrator could map out from his foreknowledge exactly what the troops would require. Upon this basis the limited stock of stores prepared for the present war was obviously compiled, but it cannot be said that subsequent requirements have been simply in arithmetical progression, rising with the number of men employed.

Evidently the demand for textiles has been influenced by the strategy of the campaigns. The strategy has undergone changes, surprise after surprise has been unfolded, and if note is taken of some of them it is purely with a view to showing the necessity of having behind the forces in the field a textile industry large and adaptable enough to minister to their exact requirements.

TEXTILES WON THE GAS ATTACKS

The first to be mentioned is a surprise, perhaps greater than any in the history of warfare, that was encountered at the second battle of Ypres. This was the first occasion of the use of the new villainy, poison gas. Clouds of greenish asphyxiating gas floated down to the lines held by French, Territorial, Canadian and British troops and the men had nothing to save their lungs and their lives. The best they could do was to breathe through a woolen sock steeped in urine and for a few fateful days, until a more efficient safeguard could be brought out from England, the men had nothing better. Then the Haldane respirator came; a muslin muzzle with a wad of cotton wool impregnated with photographic fixing salt, or hypo. The respirator was not good enough to be retained indefinitely in use, but the confidence that it gave and the protection it afforded saved civilization from being overridden by the foe. It was followed by an improved appliance, a woven hood which in the course of gradual improvement developed into the "P. H." helmet, fitted with mica windows and a breathing tube. This in turn has been superseded by a box respirator of which the only textile parts are the small piece of balloon cloth forming the mask and the elastic web for securing the mask to the face. The case is as clear a one as will be found of a strategical surprise requiring to be combated by woven fabrics and chemicals, and there was never better cause to bless the quickness and skill that supplied the want.

MYRIADS OF JUTE SANDBAGS

It is safe to say that nobody foresaw how much and how long this would be a war of trenches. Nobody reckoned upon earthworks of over a thousand miles frontage with parapet and parados, elbow rests, splinter proofs, revetments and emplacements built up mainly of earth shoveled into sandbags. The Germans and their friends have made bags of many materials, but for the Allies the war in this respect has been a war of jute. The ability to turn out bags by the myriad has meant salvation to those who had to man the breastworks in the wet part of Flanders, where of necessity cover had to be constructed above ground.

Strategy prompted entrenchment tactics and counter-strategy suggested the camouflage of gun positions and the concealment of the trace of trenches from overhead and from frontal view. It is no secret that painted canvas has been used upon both sides, and was chosen by the Germans to disguise the white cement of their Hindenburg line. This employment upon a large scale is a new feature of warfare and joined to all the jute, linen and cotton canvas taken for tents, buckets, corn sacks, baths, ground sheets, tarpaulins, nose bags, etc., the amount gives impressive testimony to the importance of textiles.

A new strategy brought in the aeroplane in inconceivable numbers and this development in a field far wide of tex-

(*Continued on page* 165)

Functions of Council of National Defense

Duties of Its Divisions and Experts—Operation of Its Purchasing Machinery

(By Our Regular Washington Correspondent)

EVERY industry that has dealings with the Council of National Defense, is evidently much at sea as to the organization of the Council, the duties of the various divisions and experts and it is the purpose of this article, in so far as it is humanly possible, to clearly outline the duties of the recently organized War Service Committees, the relation of the textile experts to the Council, the way in which contracts are handled and such other matters as inquiries have shown are bothering the trade. Perhaps there is no better way of handling this subject than by a series of questions which have been submitted from time to time to the TEXTILE WORLD JOURNAL.

THE GENESIS OF A WAR SERVICE COMMITTEE

What is a War Service Committee and what are its duties? It would doubtless be well in answering this question to go backward a bit, to point out what the trade is well aware of, namely, that when the war first broke out the Council officials asked certain individuals, experts in their own lines, to come to Washington and advise them on various matters. As time went on and the tremendous proposition of supplying materials, raw and finished, loomed up, more and more men were asked to come to Washington. These men were grouped finally together and were formed into various committees, the duties of which were to gather statistics as to the output of various mills, to advise on contracts, and as has now developed in the hearings before the Military Committee of the Senate, to actually do everything in the way of drawing up a contract but signing it, this being delegated to the Government official who is responsible for payments.

As has been reiterated so many times a situation grew up, in every line of industry, where a man was advising the Government on certain contracts when the firm with which he was connected, or might even own, was bidding. There is no assumption in Washington that these men were doing anything wrong and yet it easily can be seen that this was anything but a healthy situation, ethically or politically. So as things progressed Congressmen began to pry into the situation until it was seen by officials of the Council of National Defense that the matter would have to be cleared up. It was therefore decided that these committees would have to be dissolved. When this was done, in order to show the country that it was a case of necessity, the Council gave out an official statement, in which it said in part:

THE COUNCIL'S EXPLANATION

"These committees have given faithful, patriotic, and invaluable assistance to their country. Many of the individuals serving on them have done so only at great personal and financial sacrifice. The thanks of the entire country is due to these men who unhesitatingly and unselfishly responded to the Government's appeal for aid.

"Technically, however, this necessary emergency machinery set up by the Council was not in the administrative sense ideal as a means of making permanent the mobilization of industry in a democracy at war. Practically it was effective, but the committees were placed before the public in a position unfair both to themselves and to the Government. The Council and its War Industries Board, after giving this matter serious thought for some weeks, have concluded that it is now possible to arrange for meeting the Government's needs through the appointment of highly qualified individuals as Government employes and expert advisers, and also to meet the needs of industry as well as to assist the Government by representative committees created not by the Government but by the industries themselves.

"It therefore has become feasible to discontinue the embarrassing situation wherein the members of the present committees are apparently called upon to act both as Government agents or advisers and at the same time as representatives of the industries. In dissolving the present co-operative committees of industry, which were appointed by and under the direction of the Council, the action is taken only with the highest praise and thanks for their splendid and indispensable work and at the same time with the hope that representative committees of the industry will be formed by the industries themselves at the earliest possible moment. The establishment of such committees, formed so as to entitle them to speak for their entire industries, will render immediately available valuable sources of information upon which the Government can draw in connection with the countless business and industrial problems attendant upon the conduct of the work necessary for the prosecution of the war."

Speaking on the subject of the old co-operative committees and the new War Service Committees, W. S. Gifford, Director of the Council of National Defense, told delegates to the War Service Conference held recently in Washington under the auspices of the Chamber of Commerce of the United States, that the co-operative committees which have been dissolved had played an important part in assisting the Government to organize for the war. He paid a high tribute to their faithful and unselfish work, but he pointed out that it had become apparent that it would be advisable to have the industries themselves name committees which should do some of the work which had been done by the Council's committees.

Coming down now to the question, what is a War Service Committee and what are its duties? As stated in the announcement sent out by the Council when the old co-operative committees were dissolved, the desire was expressed that the industries themselves should appoint committees and it seemed altogether fitting and proper that officials of the Chamber of Commerce of the United States, which is probably in closer touch with commercial and industrial organizations, than any one other organization in the United States, volunteered to do what it could to help this work along. Conferences were held almost daily between officials of the Council of National Defense and the National Chamber, culminating in a meeting held in Washington in December of the chairmen and members of many of these new War Service Committees. The functions of these committees were perhaps better outlined at this meeting than anywhere alse and contained in a resolution passed was the following:

"The War Service Committees will take up with concerns in their respective industries the needs of the Government, and determine how and where, in their judgment, the work can best be done.

"The War Service Committees will sift such data and recommend to the Industrial Representative (George N. Peek) or other government agencies various concerns, having in mind their financial standing, their ability to perform and the local industrial conditions.

"The War Service Committees will act as a clearing house for available plant capacity, notifying the Government thereof, in order that needless expenditures for additional plants, and equipment may, as far as possible, be avoided.

"The War Service Committees will, at the request of the Government, render any further service in which they can be helpful in working out problems of the Government.

"The object is to give the Government the benefit of the suggestions and advice of the industries involved, as it is believed that the work of the Industrial Representative or other Government agencies can be facilitated by a knowledge of the plants ascertained through the assistance of men actively identified with the respective industries.

"These committees should be ready at all times to meet with any of the departments of the government whenever their advice is desired, to discuss questions affecting the industry raised by the war needs of the government. The committees might also, on their own initiative, present to the government questions which call for consideration."

The War Service committees, although the matter does not yet seem to be entirely understood, have been appointed by the various associations of the various industries. Sometimes these committees have been appointed at the large conventions, again they have been appointed by the president of an association after conference with other leaders in the same field. Their duty, in short, is for the giving of information, and not advice, as was the case with the cooperative committees. This, then, should answer the question as to what the new committees are and their duties.

BUSINESS MAN MAY ADVISE UNDER OATH

Another matter that has apparently been bothering the trade is whether a man may be a member of a War Service Committee and also an expert adviser to the officials of the Council. The definite answer to this question from officials is that there is nothing to prevent this. There is the very definite provision, however, in making this statement, that the man, as an expert adviser, must take oath that he has no interest in any contract on which he may be called upon to give advice. Only under such an arrangement,

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The Work of a Co-operating Committee

Wool Men Anticipated War Emergency—Services Rendered by Industry's Experts

By *Winthrop L. Marvin,* Secretary and Treasurer, National Association of Wool Manufacturers

EARLY in December the resignations of the members of the Joint Committee of Wool Manufacturers co-operating with the Council of National Defense were sent to Julius Rosenwald, Chairman of the Committee on Supplies of the War Industries Board in Washington. Thus eight months of active work on behalf of the industry for the government were completed by this committee, which was one of the very first to offer its services to the nation before our entrance into the war with Germany. The initiative in the formation of this committee had been taken at a special meeting of the members of the Woolen Goods Exchange, following the annual meeting of the National Association of Wool Manufacturers in New York City on Feb. 7, 1917. The manufacturers present at the session of the Exchange unanimously voted to invite Colonel John P. Wood, President of the National Association of Wool Manufacturers, in co-operation with Herbert E. Peabody, President of the American Association of Woolen and Worsted Manufacturers, to appoint a joint committee to arrange as fully as possible for concerted action by the wool manufacturers of the country in furnishing the military fabrics that would be needed in the war. The desire was expressed that Colonel Wood should be the Chairman of this committee, which as duly organized, was as follows:

PERSONNEL OF COMMITTEE

Colonel John P. Wood of Philadelphia, Chairman.

Nathaniel Stevens, president of M. T. Stevens & Sons Company of North Andover, Mass.

George C. Hetzel, president of the George C. Hetzel Co. of Chester, Pa.

Robert T. Francis, of the Pontoosuc Woolen Manufacturing Company, New York City.

Moses L. Shuttleworth, agent of the Washington Mills of the American Woolen Company, Lawrence, Mass.

Charles H. Wilson, of James and E. H. Wilson, Pittsfield, Mass.

Spaulding Bartlett, treasurer of S. Slater & Sons, Inc., Webster, Mass.

Subsequently there were added to the committee Messrs. Francis R. Masters of Lawrence & Company, New York City; Frederick R. Edington of the American Woolen Company of Boston, and C. Brooks Stevens, treasurer of the United States Bunting Company of Lowell, Mass. Thus long before Congress declared war on the German Imperial government a committee authoritatively representing the wool manufacturers was ready for service.

The Council of National Defense was duly notified, and on Friday, March 30, the committee met in preliminary conference with Julius Rosenwald and Charles Eisenman of the Committee on Supplies in Washington. A general understanding of what was expected of the committee was then secured from Mr. Rosenwald and Mr. Eisenman. A statement of the wool consumption of the country and other data of current interest were presented, and it was arranged that the committee should furnish certain other information, as required. On April 2 the members of the manufacturers' committee received this letter from Mr. Eisenman:

"I am pleased to inform you that

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After-the-War Prospects In England

An English View of the Trade Outlook
Much Cheap German Trade Unattractive

By *J. A. Hunter,* Regular English Correspondent of TEXTILE WORLD JOURNAL

DETAILED plans for after-the-war trade are felt to be not worth making by men who neither know what the market will demand when the war stops, nor what there will be to make goods with. It is believed in some English quarters that for months after the war, conditions will be so like those at present obtaining as to be nearly indistinguishable. Demand will not be for army goods, but for staples that in practical effect will be the same as army goods in their plainness and uniformity. The probability that the fabrics will have to be made out of government material and be marketed at controlled prices is too strong to be ignored, and in that case the manufacturer will still find himself doing very much as he is told.

An elaborate official scheme is being drawn up for the release of labor from the colors on demobilization, and upon present appearances it would seem that an employer will have a task to satisfy the authorities that he is competent to maintain in work the man for whom he asks. The employer's convictions upon that point will not necessarily be enough, as there are officials to satisfy and also a board of economists who have to certify to the prospects of a trade before an enlisted man can be entrusted to the keeping of men of business. It can be assumed that the safety precautions will not be permitted to clog progress beyond a certain degree, but in regard to help all is not plain sailing.

RENEWAL OF MACHINERY AND PLANTS

The conditions of machinery cannot be exactly foreseen, for this is a matter contingent upon the duration of the war. The longer war lasts the more run down machinery will become, for all pre-war standards of maintenance and renewal have been neglected. Machines due for scrapping at any time in the last three years are working still and breakdowns have been repaired by patchwork. The order books of machine makers at the present time are proof enough of the size and strength of the demand, and buyers know that for two or three years following peace any purchases of machinery will be at high prices and any extensions of buildings will cost money. At the same time it is not known that the uncommonly high outlays will prove an effective deterrent.

Circumstances vary, but in an important number of cases manufacturers have had their normal operations blotted out for a period of years, and when both the war and the immediate peace flurry are over they will have to make a fresh start. Not all of them will be able to go back to their old lines of trade. There is no serious likelihood, for instance, that business with German markets will ever be the same again, and in a few cases the quantity of surplus government stores remaining when the war is over will drive manufacturers afield. Men will be limited by the nature of their machinery, and, allowing that little new plant can be introduced, there remains the question of what is to be done with the old.

WILL BE SLOW TO TAKE UP FANCIES

Is the spinner to go back to his old range of qualities and of counts? The question is of particular force to those in the less standardized branches of trade, and granting always that he can get work on fewer numbers and in fewer counts, the worsted spinner will welcome relief from the recurrent changes which add so much to his responsibilities. The huge war contracts for the production of a single article have given him a taste for simplicity. Upon the whole it is to be believed that the worsted weaving manufacturer will find all the employment he requires in cloths of few qualities, and so long as that is so the spinner's course should be straight. Ultimately the old question will confront the manufacturer: Whether to stick to plains and plain-fancies, or to re-enter the high fancy field with its small quantities to a pattern, its extravagant cost in designing, pattern-making and selling.

Presumably no man ever went into fancies who was satisfied with the margin he could make upon plains. Just because so many people can make them the prices of plains are kept low. The time for fancies will come again, but while the going is good enough the expenses of that trade will be shirked. The number of exclusive designs, the unnecessary abundance of colorings and the disregard of mill economy shown in so much of the designing done for the highest class worsted and tweed trades are the gradual accretion of the processes of competition. Indulgence in these luxuries has been compulsorily checked during the war and so long as a proportion of business is to be had in plains at a remunerative price business in fancies will be less sought after. The logic applies all round to the fancy trades in general and is of least force in relation to the semi-fancies, or goods closest to plains. An approach to the pre-war variety of products will only come when competition forces it and this will be with the arrival of bad trade.

There have been expectations of a permanently larger trade for British manufacturers through the capture of markets hitherto held by German goods, and the development along Continental lines of cotton waste spinning, worsted mule spinning and specialty finishing. That hope, never as robust in manufacturers as among outsiders, is no stronger than it was. There are few lines of German business that Englishmen would care to take as long as sale can be found for goods of their own type and it is not clear that this amount would balance the loss of exports to Germany. The possibilities have not had a chance to demonstrate themselves fully during the war, and, given opportunity to get labor and machines, with suitable tariff protection, there certainly are weaving and knitting trades that can be established in England. Cheap German trade is the least wanted of any, but bigger efforts will be made to get hold of business in articles fetching higher prices, and, in point of fact, machines have been put down with that object. In truth it is not German, but British business that the British manufacturer is thinking about, and although he will detest German competition still more in the future than in the past, there are few manufacturers who would grudge the enemy the restoration of most of the business he used to do.

Textile Industry and Disabled Soldiers

Offers Meager Field for Their Re-education —Can Use Those Having Textile Experience

By *Eugene Szepesi*

Of all industrial occupations none requires such complete control of physical faculties as the textile industry. The nimbleness of fingers necessary for weaving and spinning operations bans the man with crippled arm from earning a reasonable wage. All operations require almost constant standing. Noise of machinery makes a textile mill an unfit place for the man suffering from shell shock.

OUR entrance into the European war brings into prominence one of the most important economical after-effects of this conflict—the care and re-education of the disabled soldier. To prevent these victims of the war from becoming a burden to themselves as well as to the nation at large, definite steps have been taken by our Allies to refit them for renewed industrial usefulness. This problem has received by the allied governments a careful and constant study.

During May of the past year, an Inter-Allied Conference was held in Paris for the purpose of devising methods, investigating possibilities for reclaiming and re-educating the crippled soldiers, and at the same time a careful survey was taken of all industries: How far they may be able to assimilate the disabled soldiers, offer satisfactory living to them, and not hinder the development of the industry.

SOLVING THE PROBLEM ABROAD

Monsieur de Paeuw, of Belgium, who was one of the leaders of this Inter-Allied Conference, has made a very careful investigation, and has come to the conclusion that the best method of taking care of the problem would be to have the disabled soldiers receive the assistance of a capable and competent industrial educational board which will carefully investigate the nature of injuries, the individual ability, mentality, and education of the worker, and propose a re-education on industrial lines where his efficiency will be not less than 80 per cent of the normal worker.

It has also been accepted as a false procedure to attempt the re-education of the worker in new industrial lines unless his injuries prevent him entirely from pursuing his work in the pre-war occupation.

In assigning the worker to an industrial branch for re-education, his handicaps are carefully analyzed by such boards. Dr. Amar of Paris, in his experimental laboratory, has made careful tests of how far mechanical means are capable of substituting the lost arms or limbs of the worker in industrial occupations. The instruments devised by him are indeed ingenious. However, they have not yet proven their practical value, and little hope is given to the possibility of devising mechanical instruments suitable for use in industries where the nimbleness of the fingers is of primary importance. These instruments are too complicated and get out of order too frequently. Strictly speaking, their application has not yet outgrown the laboratory experimental stage.

The investigators for the various allied governments have found the following branches of industry the most suitable for the seriously crippled: Carpentry, basket-making, tinsmithing, book-keping, leather work, shoemaking, drawing and surveying, brush-making, cooperage; also such occupations as watchmen, door attendants, janitors and kindred jobs suitable for a crippled person.

In Great Britain, municipal schools at Leeds, Leicester, Rochdale and Blackburn have opened classes for disabled soldiers to refit them for the textile occupations, but, judging from the available data, the experiment has not proved successful.

A careful rechecking of the physical qualifications demanded in practically all occupations of the textile industry brings out forcibly the fact that the nimbleness of the fingers, the perfect control of arms and of the legs are one of the most important requirements. Textile occupations that will ensure a living for a grown-up man, all require the perfect control of these members of the body. A one-armed person may be employed in the picker room in unskilled occupation, or may run an elevator, or make himself useful in oiling, as is done in many instances to-day, but to be a carder, weaver, spinner or a finisher, complete control of hands and legs is essential.

The loss of a few fingers will not hinder a worker to a great extent, and such a person cannot be considered disabled, nor a person with one leg or a paralyzed leg. He may still perform his work.

It is notable that half of the discharged and disabled soldiers are suffering from internal troubles, like tuberculosis, heart trouble, rheumatism and nervous disorders; for this element the textile mill is unsuitable. Deafness, one of the important injuries in the present war, will not seriously handicap a textile worker, especially since lip-reading is taught to such soldiers.

The conclusion is, that the textile industry can offer very little field for re-educating disabled soldiers, and will probable contribute to its fullest extent by assimilating the textile workers who suffer serious injuries during the war. This element will find that the textile industry will do its full patriotic duty to the returned wounded hero of the battlefield; but the authorities who are already taking up this work should understand that, for re-education as a new occupation, the textile industry offers a very meager field for the wounded, disabled soldier.

OCCUPATIONS FOR INJURED SOLDIERS HAVING PREVIOUS TEXTILE EXPERIENCE

Men with one arm: Designing, card cutting, Jacquard lacing, card grinding, bale opening, picker room work, distributing, filling, weighting, machinery oiling, store room work, shipper, case nailer, elevator man, truckman, sweeper.

Special artificial arms have been successfully constructed by the Allied governments that can be used to advantage in some of these occupations. Also the use of the left arm to perform all functions formerly done by the lost right member is successfully taught.

Men with one foot can practically continue their former occupations, provided their duties do not require constant walking.

Men who have lost both feet can find useful work in almost all branches of the industry. Those with little talent and intelligence can be trained to become designers or to perform clerical duties, for which there is an opportunity in every mill. In Great Britain they are successfully trained as operators of sewing machines and our knitting industry has big possibilities along this line.

New Work of Cotton Manufacturers' Association

Convention Subordinated to Committee Work Constantly at Work on Important Problems

By *Rufus R. Wilson*

Secretary National Association of Cotton Manufacturers

THE record of the National Association of Cotton Manufacturers during the past year has been one of needed expansion and hopeful progress. The compelling problems projected by the war have awakened its members to a new and clearer realization of the value and importance of collective effort, and the result of this awakening has been evidenced in a general broadening and quickening of its activities. Through its committees and executive staff, the National Association is now constantly at work with intelligence and resolution on problems that reach and affect every phase of the textile industry.

WORK OF STANDING COMMITTEES

What it has done and hopes to do are perhaps best reflected in the tasks which its several standing committees have now in hand.

The Committee on Statistics has already made gratifying progress in building up a statistical bureau in which there shall be instantly available for consultation and use accurate data pertaining to the tariff, taxation, hours of labor, standards of living, wage scales, and all other matters of vital concern to the textile industry.

The Committee on Mill Supplies and Materials, as a result of plans now under way, hopes to establish standards in each line which will be a guide to purchasers in selecting the supplies and materials best adapted to individual needs.

The Committee on Labor has begun a thorough study of the industry, with a view to finding means to overcome the labor shortage which has been a serious and continuing handicap in recent years.

PLANNING A RESEARCH PROGRAM

The Committee on Technical Problems and Research is conducting an investigation as to what is being done in other countries to bring science and industry into mutually helpful and profitable relations, and is also formulating a program for constructive effort, based upon the services of the staffs of the several textile schools, and such institutions as the Massachusetts Institute of Technology, and of various testing laboratories already established and in operation. Industrial research promises to play a large part in American industry in the years just ahead of us, and the National Association is resolved to be an effective factor in this field.

IMPROVED HANDLING OF COTTON

During the past six months, the Committee on Rates and Transportation has been earnestly and continuously pushing a campaign to secure long-needed reforms in the baling and transportation of cotton, and it is well within the truth to say that through its efforts more has been achieved than during any like period in the past. The time when the American cotton bale shall no longer be an object of criticism and ridicule has been brought much nearer through plans approaching consummation to make high density the rule, instead of the exception. The committee also has devoted its energies to securing an uninterrupted flow of cotton from the south to northern mills.

ACCUMULATING TARIFF DATA

The Committee on Tariff and Taxation is giving careful consideration to the economic problems produced by the war, and is gathering the material which will enable it to give intelligent counsel and assistance to our Federal law makers when the time comes to revise our present tariff policies at the end of the war. Indeed, when Congress again takes up the tariff question, the National Association will be able to go before its committees better equipped with data of all kinds than at any previous time in its history.

TO HOLD AND EXTEND EXPORT TRADE

The Committee on Foreign Trade and the Committee on Cotton Exports and Imports, without advertising their labors, have done much quiet and effective work in co-operation with the various departments at Washington in properly shaping Government cotton, so far as it affects the control of the exports and manufactures of cotton to nations contiguous to the Central Powers, the imports of Egyptian cotton, the blacklisting of enemy firms in neutral markets and cognate matters. The Committee on Foreign Trade is now studying ways by which the export trade in cotton goods built up by the United States since the war broke out in 1914 may be retained when it ends, and the textile industry enabled to make full and profitable use of the provisions of the Webb Law lately enacted by Congress.

AMBITIOUS SOCIAL WELFARE PROGRAM

The Committee on Social Welfare of the National Association is in a measure a new departure, but promises to justify its creation by keeping members of the association promptly and accurately informed as to legislation already enacted or in prospect regarding health insurance, old age pensions, labor exchanges and workmen's compensation. One of the committee's activities at the moment is a conference to be held in Boston on January 18 at which such subjects as "Labor During and After the War," "Fitting the Crippled Soldier for Self-Support," and "Health and Safety in Industry Under War Conditions" will be discussed by experts.

IMPORTANT COTTON PROBLEMS

The last to be created of the committees of the association is that on cotton buying. Its immediate task is to find a fair and satisfactory answer to the question of whether the manufacturer shall pay for his cotton after its arrival, rather than on receipt of the bill of lading and draft; but it will also concern itself with the matter of price fixing, should the latter be decided on as a war measure. Another activity which this committee has just undertaken is a campaign of education to prevent the planting of a decreased acreage in the south, reports of which have been persistent in recent weeks.

CO-ORDINATED IN NATIONAL COUNCIL

In brief, the foregoing gives a quick but fairly accurate review of the various activities the National Association has now under way or in contemplation. Made up as it is, primarily, of northern manufacturers, the National Council does not assume to represent the textile industry as a whole. Southern manufacturers make their needs and opinions known through The American Cotton Manufacturers' Association; but, in order that the cotton industry as a whole may find, when there is need for it, quick and adequate expression on national and international questions, the National Council of American Cotton Manufacturers has been formed, made up of an equal number of representatives from each association. In this way, matters of national concern originating either in the National Association or the American Association are eventually taken over and carried forward by the National Council, a method of procedure which promises to be increasingly productive of substantial results, at the same time making possible a larger measure of good feeling and of result-getting teamwork than has been practicable in other years.

All in all, the officers and directors of the National Association feel with good reason that it is doing a work, present and prospective, which amply justifies its existence.

Textile School Work in Wartime

Bradford College Tests for Trade and Government Shows Germany Very Short of Wool for Uniforms

By *J. A. Hunter,* Regular English Correspondent of TEXTILE WORLD JOURNAL

HIGHER education of all kinds has been interrupted by the law which sends all fit youths to the fighting forces on attaining the age of 18, but in the evening classes textile instruction is being carried on vigorously in England. The difficulty is not so much to find students as teachers, for competent instructors are never too abundant and men with mill responsibilities have less opportunity than ever of doing evening work. There are 500 students taking tuition still under the Bradford Technical College, including those below army age and a considerable number of men who have been exempted for one reason or another from army service.

It is within the power of the exempting tribunals to attach any reasonable condition requiring some service of national importance from exemptees in their spare time, and a considerable number of young men have felt the obligation to benefit themselves to the fullest extent for their civil jobs. As men are withdrawn from the mill, others with only partial knowledge of the duties have to learn how to replace them, and in giving the necessary knowledge the textile schools are performing most necessary work. The technical teacher is recognized as an especially valuable public servant, whose energies are in large part expended in making up the defects of the skilled labor supply.

TESTING FOR THE TRADE

Most of the large schools attempt to carry on other work than pure teaching and the Bradford College continues to receive samples from parties desiring a technical report in order to fix responsibility for some defect in manufactured goods. The independent position of the school entitles it to the confidence of the parties to a dispute, and the reference of samples to it furnishes a link between the schools and the trade. Investigation shows to the school experts what members of the industry are doing in the course of their daily work and permits of a convincing illustration of the effects of error. It may be their experiences in this connection which go to make textile school men doubtful of the advantages of the subdivision of industry and advocates of a coordination of manufacture which keeps all considerations in view from the very start. They very often find parties to the manufacture of worsted goods pulling against each other in their ignorance of the finished result that should be aimed at by one and all.

WATCHING GERMANY'S WOOL SUPPLY

Every two months specimen German uniforms are received from the battle front and the analysis of the fabrics at the Bradford College keeps the British Government continually informed of German measures to circumvent the shortage of the wool supply. It is regrettable that for the time being the results of the analysis have to be treated as confidential. There may be better reasons than a civilian would guess for not publishing the precise amounts of paper yarn, cotton and shoddy in fabrics that ought to be made of strong wool. The reasons are unknown, and in looking at the case through a manufacturer's eyes it seems mistaken policy to deny to friends the advantage of any discoveries that the enemy has made. Other people than the enemy are short of wool, and the importance of hiding their achievements from enemies' eyes would appear greater than that of concealing details of German technical arrangements.

RESULTS OF TESTS ARE SECRET

The exact results may not be made known, but two things can be said: The analyses prove that the enemy is painfully short of new wool and that he has displayed remarkable resourcefulness in making the best of his available materials for clothing and underclothing. Beyond their interest in that sense the uniforms have another, as they reveal German ideas of what sort of clothing is reckoned suitable for special arms of the service. It is peculiarly interesting, for example, to go closely into the various points of the fabrics worn by German airmen. Doubtless the military authorities profit privately from the investigations made, but they do not publish their facts as the textile public would wish.

The examination of sample uniforms is in the nature of a test of the information supplied by statistics. Before the war shipments of wool were all recorded and the quantity finding its way into Germany was known. The annual consumption within Germany has at least been estimated approximately and it can be assumed that a good idea of the actual quantity in reserve has been formed. The extent of the seizures in Antwerp, Roubaix and Lodz is known to within a few thousand pounds, and, with the current supplies, of which the total can be estimated fairly closely, it is not difficult to compute the total resources.

PAPER AND FLAX IN WOOL UNIFORMS

Accounts of the composition of German uniforms are somewhat contradictory and specimens of good, all-worsted officers' and non-commissioned officers' cloth have been privately received no longer ago than this summer. The general trend, however, shows a progressive deterioration and specimens seen in November last were as far reduced in quality as to contain only 8 per cent. of

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A Textile Man's Observations in South America

European Textiles Are Still Favored —Our Opportunities and Shortcomings

By *Charles H. Fish*, Former President National Association of Cotton Manufacturers

IN attempting to explain the conditions existing in South America we are confronted with exactly the same problem that is presented in attempting to picture the conditions in North America; the subject is so large, and conditions in the different countries vary so much that it is impossible to do them justice in a few words. You can only generalize; and to generalize is usually unsatisfactory. However, I shall submit briefly to your readers my impressions of South America and the chances we have for developing our South American trade in all its branches.

First, I wish to make a brief statement as to the cotton situation and the opportunity now presented for manufacturers in the United States to obtain a permanent foothold in that immense and rapidly developing country. For the reason that my journeyings during my recent trip were confined to Bolivia and to the west coast countries these personal observations cover only that part of South America; but I believe that generally speaking the situation is the same in Argentina and Brazil as in Chile, Bolivia, and Peru, and the other countries of the north and west. The one difference is that some of the countries manufacture more and export less than others.

Some of the South American countries have no textile mills, and all the cloths used, with the exception of the hand made goods of the natives, are imported. Bolivia with her two and one-half million people has no textile mills, although a large amount of wool is exported and a fine grade cotton grows wild, or without cultivation in many parts of the great plains which lie east of the Andes.

LITTLE EVIDENCE OF YANKEE ACTIVITY

It is well known that prior to the war comparatively few textile fabrics manufactured in the U. S. A. found their way to any South American countries. England first, then Germany, then France supplied the bulk of the requirements. At present there is no importation from the countries mentioned, and unfortunately for our future trade relations our own mills have been so well supplied with orders that, for the moment, there is no great incentive to pursue any outside or foreign market. It may be that the South American markets are receiving at this time more attention than I know about. I do know, however, that there was very little evidence of Yankee activity in the countries I visited during the early part of the present year.

In the meantime, South America is slowly using up the very large stock of goods which they had on hand at the beginning of the war, while at the same time they are manufacturing all they can in their own plants and increasing their production as fast as circumstances will allow.

In my judgment, if this war should end soon, or within two or three years, there would not be the slightest doubt but that these southern countries would immediately give back the larger part of their outside trade in textiles to the English, German or French manufacturers, unless in the meantime we had done much more than we have already done to gain their confidence and good will.

Contrary to the general impression, the South American markets are not unreasonable or exacting. They do not, as a rule, insist upon particular finishes or extravagant put-ups. On all the more common grades of cloths, which constitute the great bulk of the business, rough yarns or minor imperfections are not noticed. The great consumers are the Indians or the half-breeds, and they are not particular except perhaps as to color and pattern.

In this connection it is surprising to note the value of the trade-mark. I was told by a number of merchants in the important cities that the native buyer seldom examines the fabric, but very often has a decided preference for the cloth stamped with the picture of an Indian's head, or a cotton boll, or a power loom, or some one of the trade-marks which has attracted his eye and which he has remembered.

I think I am safe in saying that there is, as a rule, but little prejudice on the part of the consumer against the United States goods, all things being equal, but he does not know us as he knows the English or the Germans, and there is a prejudice against the "Gringo" himself. We cannot build up our trade through direct intercourse with the consumer; he is too far away and we do not speak his language: but it is the importer or the merchant with whom we must deal, and their good will is essential. As the matter now stands we are looked upon as foreigners in whom they have not much confidence, while they look upon the English and some of the other nations of the continent as near neighbors and friends. Roger Babson in his recent book, "The Future of South America, states as follows: "Thus there is in South America a close affinity to all European standards; the people do not know North Americans. They are willing to welcome any Yankee who comes to them with an honest and open mind, but he must prove his purpose to be sincere." . . . "The United States had little to do with the commercial prosperity of Latin America. Hence, the markets of South America, however vast their consuming power, can be reached only by the understanding that Europe is a great competitor and they must meet European standards if they are to obtain the success in South America for which they hope."

From my investigations I am quite convinced that the standards to be met are largely the standards of treatment and the standards of business methods. It is not necessary for our cotton manufacturers to always copy the fabrics or the finish of other countries in order to capture our share of the trade. In introducing our own goods, however, we must carefully lead our southern friends rather than attempt to drive them to our ideas. I find that the general opinion is that we have been in the past exacting and independent, showing too plainly that we have considered their merchants and their markets inferior and sought after only when there was nothing better. We have questioned their plan of credit, which, although not business-like according to our views, is well established; and by various other ways we have indicated to the South American merchants that if business was to be done at all it must be done promptly, and in our way, not heirs.

STREET SCENES IN LA PAZ, BOLIVIA

MUCH TERRITORY UNDEVELOPED COMMERCIALLY

South America is a very large continent. Most of us are familiar with the size in a more or less vague way. Brazil, the largest country, has an area of 3,218,991 square miles, which is practically as large as the entire United States, including Alaska. The population is only about 22,000,000 and there is no reason why it should not in time be 50,000,000 or more, as in the greater portion the climate is good and the soil fertile.

Bolivia, which is the third country in size, is as large as the whole of Germany and Austria and has a population at the present time of approximately two and one-half millions. Here is a country lying entirely in the tropics but, owing to the altitude, has a superb climate, except of course in the extreme northern portion along the Amazon tributaries where it is hot, and in the highlands of the Andes where it is cold and barren. There are large areas in

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The Perils of America's Labor Market

A Labor Priority Board with Co-operation of Employers Needful to Accomplish Results

By *Frances A. Kellor, Assistant to the Chairman of the National Americanization Committee*

THE big question before industrial America today is not how to increase its supply of labor. It is how to use it. We shall never know what increases we need until we have learned to use our available supply. With an enormous reserve of women and a very considerable number of unemployed and shifting workmen, great masses of unskilled labor, including the negroes, and with tremendous possibilities in economy by the dilution of labor, reduction of labor turnover and utilization of "retired" workers, the immediate task is organization of the labor market. The improvements in management and in the reduction in useless employments, have hardly yet been considered upon any national or standard scale.

What is the situation in our labor market to-day?

A DESTRUCTIVE LABOR POLICY

First, as to the alien. We are now engaged in the most destructive labor policy of any civilized nation. With the declaration of war on Austria at least 800,000 males of draft age have been added to the alien enemy lists. With the inclusion of women, as alien enemies, recommended by President Wilson there will be added at least another million of alien enemies. The establishment of prohibited zones and the enforcement of regulations will inevitably further disrupt the labor market. Men, and in the future women, will be barred from their jobs and from going to and from their jobs, where there are ferryboats and trains within the prescribed areas. The United States is putting just outside of this 100-yard and one-half mile limits thousands of unemployed men and women, with no official machinery for transferring them to other employments in non-war zones and industries. This is colossal waste at a time when America is sending hundreds of thousands of men abroad and is crying for workers. The reduction in the skill of these men and women, the impairment of moral and physical standards due to idleness and suspicion and suffering, we are in no position to measure, but we know it is a grave loss at this time.

COMPETITION FOR LABOR

Second, as to employers. At this crisis they are still following the time honored method of taking each other's employes and are pursuing a ruthless and sometimes unscrupulous competition for men. While an ever increasing number view with alarm a labor turnover of from 100 to 600 per cent, others are still indifferent to the writing on the wall. We are still lacking in the co-operation that dovetails seasonal employments and the idle seasons of one industry are not connected with the rush seasons of others.

LABOR UNREST SERIOUS

Third, as to employees. It is asserted that the war has made little or no change in the estimate of 10 per cent of skilled and 20 per cent of unskilled workers are voluntarily unemployed every day changing jobs, looking for jobs or "laying off." The shifting of men to war industries is still accomplished largely through the crude methods of advertising, private employment agencies and long lines of waiting men attracted by signs in the windows or on the gates. Unrest prevails throughout the industrial world and propaganda playing upon the temptations and weakness of workmen is skillfully distributed. A labor representative from abroad, after a stay in the United States of six weeks in which he traveled over the country, said that if the number of labor strikes and disturbances he had personally seen or known about had occurred in England, it would have lost the war.

PROBLEM OF FEMALE LABOR

Fourth, as to women. We know that throughout the country women are being substituted for men. We know that some employers are maintaining the standards of pay and of conditions and are protecting women workers. We know also that women are being substituted for men in some industries where it is unnecessary and men are being displaced and that some of our industrial leaders put women to work first and provide for their care afterward. In the substitution of large numbers of women and their transfer from office to shops we are facing grave problems of protection, housing and adjustments about which there is not yet any common agreement.

For instance a railroad recently advertised for women to handle scrap iron in its yards. Imagine its consternation when instead of the aliens it had expected, American women from offices and homes and stores presented themselves saying they needed the higher wages offered. No provision had been made for rest rooms or for otherwise handling such women. Welfare work became a rush order when it should have been man-power engineering forethought.

UNREGULATED LABOR AGENCIES

Fifth, as to the government. The competition and its methods among departments does not differ much from that among employers. Each one thinks its work the most important and is in the field for men. Each one charged with a big order for material is establishing a reserve of men to get its work done. The governmental labor exchange system in this country consists of some 93 combination Federal - State - Municipal agencies, scattered throughout the United States with limited funds. Loosely affiliated with them are some hundred or more state and municipal agencies. This "system" competes with some 5,000 private agencies charging fees, long established in business with clienteles and speaking the various languages of those to be placed at work and having considerable capital. There is no national regulation of this field—the agencies are unrestrained as to methods and means. The cards are stacked against the government. Without regulation establishing a fair field and defining the rules of competition the government cannot organize the labor market successfully.

There are thousands of employers employing agents and spending fortunes in advertising for workmen. In one automobile town they will show you a well-worn path made by the men who go from one plant to another, often with no betterment of conditions or wages—then back again. One plant holding very important war contracts employed in July 250 new men every week to maintain the average of 2,400—at the rate of 13,000 a year!

Sixth, as to well meaning citizens. It is not only the private fee agencies and individual employers but hundreds of philanthropic agencies muddle the situation still further. There is a great deal of talk about interfering with the laborer's right to change and move from place to place, but at least 50 per cent of this shifting condition is due to artificial stimulation by agents seeking men by advertisement, by private agencies and by unstandardized rates of wages and opportunities, or from other causes that have nothing to do with the individual's freedom of action.

ESTABLISHMENT OF JUST RELATIONS

All discussion of organizing the labor market is futile and wasteful unless we give prime consideration to the six elements just described. We have not the advantages of England with its comprehensive system of labor exchanges and employment boards and its high percentage of organized labor acting as a unit. We deal with a disorganized market having vital conflicting competitive elements.

There is one immediate step necessary to bring order out of the existing chaos and that is to see that justice prevails as between industrial plants, as between governmental departments seeking men, and as between the men and women seeking work. It is absolutely essential to win this war that the industries that have priority of material, have priority of men and that other industries have an equitable division of the remainder. The first step to secure this is to have a Priority Board on Labor, with the following initial powers:

"To have first call upon all persons registering or placed through employment agencies. Thousands of workmen can be diverted from useless employment and be induced to work in plants where they are vitally needed. The agencies now make adjustments on locations and the government can easily make similar arrangements. Claims filed for workmen should be considered in a definite order of priority, based on facts required to be submitted."

This will start workmen in the right direction according to a system. It will eliminate friction and waste now due to competition for men. It will co-ordinate the existing work.

With this practical work in hand, such a board can address itself to the vital problem of organizing the labor market—in such ways as establishing agencies where they are needed and securing the necessary legislation to regulate private agencies doing an interstate business. It will facilitate work among existing departments and help each one to perfect its own field of operations.

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The Hyphen a Cause of Industrial Inefficiency

Americanization the Manufacturer's Problem Developed Educational Standards Essential

By *Eugene Szepesi*

THE DREAMY HUNGARIAN, THE REFLECTING POLE, THE DETERMINED GREEK AND THE WIRY ITALIAN; THE BASIC VIRTUES OF OUR "MELTING POT"

OUR entrance into the present war has directed attention to the danger of the unnaturalized foreign labor element in our factories. While it had not been entirely unrecognized by our industrial managers, present conditions have brought out more forcibly than ever the necessity of combating this evil, which has not only proved a brake on our industrial progress, but an outspoken danger to its existence.

Associations like the National Americanization Committee and the Americanization Branch of the Young Men's Christian Association have labored for years to lessen this evil, with more or less hearty cooperation of the manufacturer.

The textile industry is among those employing a large number of foreigners, and the possibility of Americanization is important enough to use the present occasion to discuss the various ways and means of bringing this element up to American standards that are essential to our industrial progress.

During the last quarter of a century eastern Europe has contributed many millions of immigrants, the majority of whom now compose the bulk of our industrial labor. This element came from environments that are not only nonindustrial, but primitive. That they could not grasp our social and industrial standards is not a cause for wonder. These millions came directly from agricultural occupations, but not of the modern kind, equipped with silos, tractors and other labor-saving machinery; prior to their emigration many of them manned a plow that in shape and construction had not changed since the twelfth century. We transplanted the immigrant, who used the hoof of his horse for threshing, into a highly complex American factory, without preliminary education.

CAUSE OF NON-ASSIMILATION

We should remember that these immigrants never knew political freedom in the country of their birth, never voted, and had not the slightest idea of American citizenship. Their abuses of our institutions, and their lawless methods should be attributed to their ignorance rather than to their ill-will.

Professor Steinert, of the University of Wisconsin, pointed out in his research work years ago that the mind of the immigrant is poisoned right after his arrival by the abuses imposed upon him by his countrymen, and this treatment causes his distrust of American methods, as he sees in every step a new means for his exploitation.

The crime of underpaying and overworking, played on the newly-arrived

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Welfare Important Factor in Industrial Efficiency

The Variety of Welfare Institutions in Textile Industry Rivals Similar Developments of Other Industries

By *Eugene Szepesi*

Welfare work has come to stay. Workers should realize that they are not charitable institutions, but new instruments for assisting labor to fit itself into constantly changing industrial conditions.

WELFARE work in factories is known to us all and long ago outgrew its philanthropic aspects. It is an industrial instrument called in by manufacturers to assist in obtaining a high industrial performance by the workers, safeguard their health, check labor turnover, and make the workers realize that the tie between the manufacturer and the worker is not the pay envelope alone, but a much stronger social and economic force.

So much has been said about welfare work previously that discussion as to its origin and development is unnecessary. Welfare work is not a novelty any longer in the textile industry. Every mill has inaugurated some of its features, and, as can be seen from the illustrated chart, the variety of work done in various mills is equal to, even if not larger than in other industries.

The time has passed when the worker looked upon welfare work with suspicion. The majority have realized its value to both their employer and themselves. Isolated cases of its abuse still occur, but they are due usually to unsuitable methods of introduction rather than anything else.

The nationality and intelligence of the worker have very little to do with the success of welfare work. Each case demands special application, but the very fact that we find this work among the highest type of American workers, as well as in a mill employing a dozen nationalities of recent immigrants, speaks for its success.

Our present labor conditions, combined with other unexpected forces, make factory welfare work more necessary than ever. Its greater application in coming years is inevitable. Thorough discussion of the various methods is more timely than ever, but the reader should bear in mind that in the solution of welfare work discrimination is of greatest importance. Methods successfully used in one case might be useless in another. This sort of industrial improvement is subject to the laws of other management and mechanical changes—that is, its application and success should not be copied, but developed to suit the individual case.

THE PERSONAL EQUATION

One of the most important welfare problems is the development of the personal efficiency of workers. The most perfect mechanical appliances, arranged in the best manner, will fall short of expectations unless the workers are capable of taking full advantage of the improved methods. Their failure is due more to their physical shortcomings than to their mental deficiency. The immense loss caused by wasteful labor turnover has been carefully investigated by trained industrial engineers within the last few years, and they were unanimous in their conclusion that one of the most important causes is the careless and indiscriminate method of hiring and assigning laborers to jobs.

Mills employing large numbers of workers found it worth while to organize an employment department, the hiring and firing being done by it. Employment managers began to standardize the physical and mental requirements of the various jobs and selected workers carefully to suit the requirements. The present shortage of labor will cause an even more general application of this method of selection of labor. Many mills have gone even further, and are no longer satisfied with casual observations, but have called in the services of a physician who determines through a careful physical examination whether a worker is suitable for a position or not.

THE MEDICAL EXAMINATION

Employment departments with medical examinations have proved successful and worth the expense. At the mill of Cheney Brothers, South Manchester, Conn., every employe engaged undergoes a medical examination, which determines whether the individual is physically able to perform his duties efficiently and maintain his high earning capacity.

The California Cotton Mills, of Oakland, Cal., have inaugurated the same system and this is the statement of the manager in regard to such service:

"From a humanitarian standpoint our hospital is of course excellent. It also increases efficiency. For instance, a woman with varicose veins would not be placed in a position where she had to stand all day; and a man with weak abdominal cavity would not be given heavy lifting which might result in rupturing him. Then, again, a woman with bad eyesight would not be put in a position where she might be injured by machinery, due to her poor eyesight, and neither would a party with a weak heart be given a position in our fumigation department where he might come in contact with hydrocyanic acid, etc."

It is not necessary to have a physician constantly in the factory. For plants employing a few hundred the expense would be too heavy. There is hardly a mill which could not appoint a local physician to perform the necessary examinations after the official doing the hiring is satisfied that, according to his judgment, the individual is suitable for the job; such official examinations being performed before the person is ultimately hired. The expense involved is small and would save many thousand dollars through the lessened labor turnover. The healthy man in the right job makes the efficient, satisfied and steady worker.

FREE DENTAL SERVICE

During careful physical examinations very interesting facts have been brought to light. The statement may be startling, but nevertheless true, that over 65 per cent of the workers who pass through this medical examination possess defective teeth. Bad digestion and toothache make personal efficiency impossible, so dentistry has been called in to assist in increasing individual efficiency. Workers are offered free dental service, or at a nominal cost, which may be paid in small instalments. Almost every mill having a nurse could have dental service extended, the new employes examined, and, should the teeth prove defective, a dentist called in. The best procedure is to have the examining physician, or nurse, send the person to one of the local dentists with whom arrangements have been arranged for the service.

FREE OCULIST SERVICE

Bad eyes affect the worker's efficiency as much as bad teeth. Ill-fitting glasses make things even worse. Undue fatigue and headaches are mainly caused by eye troubles. Ten minutes with an expert oculist may change the tired, inefficient worker into a new-born person. It is the short-sighted person that pads the accident list and produces seconds. Most of the physicians performing the examination are capable of fitting glasses and mills have found that this service paid the expenses.

TRAINED NURSE AND "FIRST-AID" SERVICE

The trained nurse in the factory has come to stay, and such service is of great importance in the textile industry, where, while the accidents are seldom serious, they are numerous. The insignificant cut may develop into gangrene unless properly handled by an expert, and a mill may lose the services of a valuable worker for weeks, which, of course, means a decrease of production and increased expense. Mill nurse duty includes also the supervision of cleanliness and hygienic arrangements, the visiting of the sick, offering such assistance as necessary, and, in cases where a great number of women are employed, her services will easily combine that of a social worker and form a connecting link between the employes and the management.

COMPOSITE LIST OF WELFARE SERVICE INAUGURATED IN TEXTILE MILLS OF THE UNITED STATES

WELFARE SERVICE HAVING DIRECT EFFECT ON THE PERSONAL EFFICIENCY OF THE WORKER

CLINICAL SERVICE

Medical examination of each applicant, to determine the suitability for the position.
Free dental service.
Free oculist service.
Trained Nurse and "First-Aid" service.
Day Nursery service.
Factory lunch room.
Sanitary locker rooms, drying room for wet clothes, also loaning umbrellas, rubbers and dry stockings.

WELFARE SERVICE HAVING DIRECT EFFECT ON LABOR TURN-OVER AND ATTRACTING THE HIGHEST CLASS OF WORKERS.

SOCIAL SERVICE

Modern mill villages and tenements
One, two, and three family houses, with well-kept streets, parks, and conveniences.
Factory boarding houses for single people, that are well-furnished, home-like, clean, cheap, and of high moral standard
Factory tenement and boarding house service. Investigated lodgings offered to workers coming to town.
Life and accident insurance for each worker.
Sick benefit associations.
Medical service for the worker's family at nominal monthly cost.
Saving and building loan associations.
Good school facilities or motor service to distant schools.

FINANCIAL INDUCEMENTS

Bonus or reward.
On production.
On attendance.
On length of service.
Paid in cash, mill stock, or Liberty bonds.

WELFARE SERVICE PROMOTING ORGANIZATION, PRIDE, AND SOLIDARITY.

A monthly factory organ.
Executive suppers.
Annual picnics.
Workers' Committees.
On Safety.
On discipline.
On cleanliness and good order.

WELFARE SERVICE THAT WILL ATTRACT THE YOUNGER WORKING ELEMENT AND OFFERS BESIDES PHYSICAL AND SOCIAL ATTRACTIONS, OPPORTUNITIES FOR SELF IMPROVEMENTS

CLUB RECREATION ROOMS AND Y.M.C.A. SERVICE.

PHYSICAL

Indoors
Gymnasium
Swimming pool
Basket ball
Bowling
Dancing

Outdoors
Athletic fields
Organized athletics
Field days
Tennis clubs
Baseball clubs
Football clubs
Camping grounds, with equipment for vacations.

SOCIAL

Musical Club
Factory orchestra
Singing societies
Glee clubs
Dramatic societies
Guild organizations
Vacation clubs

EDUCATIONAL

Library service
Evening classes
Industrial
English and Literature
Domestic Science
Sewing
Photography
Hygiene
Floriculture

Prizes for Travel in Vacation-Time

SOCIAL ENTERTAINMENTS

Dances
Fashion Shows
Dramatic and Musical Entertainments
Moving Pictures
Week-end Trips and Excursions.

The California Cotton Mills found it advisable to combine their hospital with a day nursery. Young mothers willing to work, but prevented through the care of their infants, were quick to take advantage of this innovation, and placed their youngsters every morning in the nursery to be under the care of an expert nurse while they were at work. With the present labor shortage, mills with a large number of young mothers among them may find this innovation worth copying.

In this mill thirty babies are taken care of at present. They are all examined before they are taken in, to see if they carry any contagious diseases which might affect others. To connect the nursery with the kindergarten is a rational step which might greatly relieve the stress of labor shortage in many communities.

CALIFORNIA COTTON MILLS. EACH EMPLOYE EXAMINED BY THE PHYSICIAN. RESULT: THE RIGHT PERSON IN THE RIGHT JOB

THE FACTORY LUNCH ROOM

All of the welfare methods discussed refer to the physical well-being of the worker, but the record would be incomplete without the factory lunch room, a welfare institution which in the last few years has spread in all industries to such an extent that there is hardly a good-sized mill wherein some form of lunch service has not been provided for.

The Nyanza Mills, Woonsocket, R. I., has developed a very practical solution of this particular problem. In this instance, the mill is somewhat removed from the center of the town, and the workers were obliged to carry their dinner-pails and eat cold and stale lunches. It needs no argument to show that such a midday meal is far from efficient in supplying the necessary food for good industrial performance, nor are employes of mills surrounded by cheap lunch rooms or saloons better provided for.

To ascertain the quality and quantity of food offered in cheap eating places around factories, the writer systematically visited many of them in the morning and noon hours. He found without exception that the food offered in the average restaurant of this character is unfit to maintain the health and proper nourishment for an industrial performance. The places are invariably unclean, the food of poor quality, unpalatably prepared, without the slightest knowledge of elementary dietetics, and offered rather on account of the bulk than the nourishing value. When a young man of twenty takes for his lunch a pair of heavy doughnuts fried in almost indigestible shortening, tops it with a big piece of pie made with the cheapest bakers' filling and a cup of coffee, as observed in one instance during these excursions, how could he perform work as efficiently as the one to whom wholesome food has been offered at a reasonable rate? We all know that bad digestion is an American institution. The quick lunch room is an arch enemy of industrial efficiency. Food consumed in five minutes in a stuffy, unclean place represents a distinct loss to those employing the consumer. The individual repeating this performance three hundred days a year will be less capable in the afternoon than if served with proper food, with plenty of time to partake of his dinner.

ESSENTIALS OF A GOOD LUNCH SERVICE

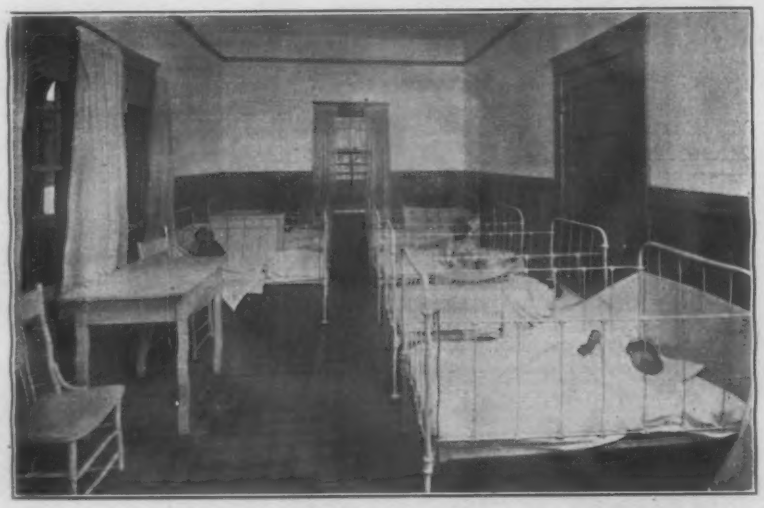
Mills intending to start dining rooms will do well in considering the results of investigations made recently in Great Britain. Here the sudden industrial changes forced by war work, made factory dining rooms inevitable in most industrial establishments. The rules for successful factory dining rooms have been compiled from the recommendations of these investigators and illustrated by American conditions:

1. Convenient Location.—The dining room should not be hidden in some obscure, spare corner of the mill, nor should it be too far from the departments. A central location is, of course, the most desirable.

2. Attractive Appearance and Attractive Location.—Within the writer's knowledge, there is a case where the mill provided dining facilities overlooking a dark courtyard, filled with junk, old machinery and rubbish of all kinds. The dining room was not well patronized by the workers. The management blamed it to lack of appreciation of the City of New York, there is a chain of restaurants known as a national institution to-day. They cater to the army of office workers, known as the most fidgety patrons. The success of this institution is not due so much to the excellence of the food as tion, failing to understand that attractiveness in any welfare institution is the first factor of consideration. Nor will unattractive furnishings make an institution popular. It should at least be better furnished than the convenient cheap eating houses near the mills.

3. Cleanliness.—In the business sec-

THE INSIGNIFICANT CUT MAY DEVELOP INTO GANGRENE UNLESS TREATED BY AN EXPERT



NURSERY—CALIFORNIA COTTON MILLS THAT PERMITS THE MOTHER'S MIND TO BE CONCENTRATED ON HER WORK, INSTEAD OF WORRYING OVER THE COMFORT AND SAFETY OF THE CHILDREN

to the absolute cleanliness of the dining rooms. The factory dining room must be scrupulously clean; otherwise, it will not serve its purpose.

4. Proper Ventilation.—The dining room should be isolated and properly ventilated to prevent the odors penetrating from the manufacturing departments. A few years ago a Western woolen mill decided to start a dining room. The workers refused to patronize it. Unfortunately, it was located so close to the wool sorting department, and at the same time so poorly ventilated, that the heavy wool odor even penetrated the food. The mill was obliged to build an addition to accommodate a new dining room, which after this step proved an unqualified success.

5. Prompt Service, Courtesy and Attention.—It should be borne in mind that the factory lunch room is not a charitable institution and workers justly expect prompt service, courtesy and attention. Any breakage of these rules will be resented by them more than if done by an outside undertaking.

6. Convenient Hours.—The luncheon hours should be convenient to the majority of workers and the dining room kept open long enough to give the latecomers, who may be detained in adjusting machinery, opportunity and ample time for luncheon.

SOME CLING TO THE DINNER-PAIL

Mill officials should not expect their innovation to receive the appreciation of all the workers. In many instances, the worker clings to the conventional dinner-pail, and would rather eat his meal among the machines in an inconvenient position than to take advantage of the lunch room, in spite of the fact that this institution is open to all with no obligation to purchase food.

It may sound strange, but nevertheless, it is true, that many workers feel constrained and uncomfortable in the company of others and prefer a solitary, comfortless corner. In one mill, the nurse made a canvass among this element recently, and was startled to hear that most of these dinner-pail clingers have never in their lives been in a restaurant; so missionary work will be essential.

To overcome this difficulty, one Western manufacturer made it obligatory to have all dinner-pails deposited at the entrance of the factory; these were placed afterwards on a rack in the lunch room in numerical order, and if so designated, heated in a steam box before dinner time. The diners had the privilege of using the lunch room tableware and were treated with the same courtesy as other patrons.

THE CAFETERIA SYSTEM

It has been found that the cafeteria system, with small, individual tables, is the most desirable for a factory lunch room, instead of the uneconomical boarding-house system with its long table arrangements. Factory workers, like any other human grouns, like congeniality and usually break up into groups of three or four persons, preferring their own company, and, to promote this, the small table arrangement is ideal. But there are always a number of individuals who prefer solitude, and for this element the individual lunch room chairs should be provided.

ENSURES QUICK SERVICE

It is a "help-yourself" method where the workers file by the serving counters, select their own food or give the order, picking up desserts, beverages, and tableware as they pass by, paying at the end of the row. Time studies taken in reference to the quickness of this service at the Nyanza Mills prove that fifteen to twenty patrons a minute can be

New Sources of Cordage Fiber Supply

Present Monopolistic Control Proved Unnecessary. Attractive Business Requiring Relatively Small Capital

By *F. A. G. Pape, F.R.H.S., F.R.G.S.*

ONE of the forcible lessons which is being brought home to us by the war, and especially to the commercial world, is that without control of raw material supplies back to the source, we would be very seriously handicapped in case of a disturbance in market and transportation conditions. Cordage fiber users are now in that predicament and are suffering from it grievously. It is a still greater handicap to have the source of supply of a raw material confined practically to one locality, for such a state of affairs lends itself only too palpably and readily to all manner of over-reaching, price boosting and kindred abuses. It is futile to go into the ethics of the thing, human nature being governed most potently today by the lure of the dollar.

PRINCIPAL SOURCES OF SUPPLY

The sources of cordage fibers at present are practically confined to two localities: The Philippine Islands and Yucatan. We may say that these two spots account for over 80 per cent of

THE AUTHOR, AND AN APPROPRIATE BACKGROUND OF DECORTICATED AND WASHED SISAL

the visible hard-fiber supply of the world. The position is made worse by the elimination of the East African supplies owing to war-operations there. This source gave promise of rapidly becoming of some magnitude.

Manila hemp has been steadily rising in price until it is quoted at this writing for "good current spot" 32 cents per lb. Sisal has risen in sympathy to 19⅜ cents for spot. New Zealand "phormium" is 18⅞ cents.

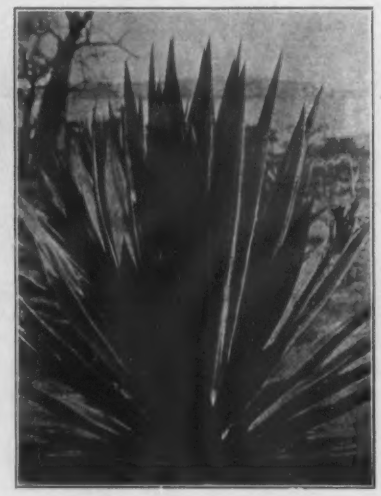
Manila hamp we could do without on a pinch, for it is principally used for finest grades of cordage only, but sisal has such manifold uses that it is almost impossible to forego a steady reliable supply in our manufacturing processes. By far the most important uses of sisal (henequen) are, of course, as "binder twine" for harvesting operations. In fact, it may safely be said that a famine in this commodity affects the price of

TRAMWAY FROM JUNGLE TO DECORTICATING MILL

our "daily loaf of bread." The consumer is, as usual, "up against it."

An intelligent review of the situation some years ago, when the revolutionary outlook in Mexico began to assume serious proportions, must surely have led more than one individual or concern to fear that the only reliable source of supply of sisal, Yucatan, might become involved in the general imbroglio, and cause unpleasant and costly interference with the regular supplies of raw stuff. It is now useless to shout after the horse is out of the stable, but why someone did not energetically prosecute a search for an alternative source of supplies does look rather like indifference, to give the matter a mild name only.

We know at any rate that the British, the French, Germans and other leading commercials would not rely upon Yucatan alone. They launched out and established sources of supply of their own; the British in East Africa, India, New Zealand, Mauritius, Natal, etc.; the Germans in East Africa, Papua and Kameroons; the French in Madagascar, Indo-China, etc; the Dutch in Java, Sumatra and Borneo. Why was a similar proceeding not inaugurated here with quite a host of suitable localities close to markets in the Western Hemisphere? When we look facts squarely in the face we will find that Yucatan is by



2-YEAR-OLD SISAL PLANT, 49 INCHES HIGH

no means the "only pebble on the beach."

TROPICAL AND SUB-TROPICAL CONDITIONS

There is a cleavage of opinion regarding the merits of sisal produced on the edge of the meridians (like Yucatan and the Bahamas), as distinct from that grown in the torrid zone (German and British East Africa). In the sub-tropical zone the sisal plant requires from seven to eight years to arrive at a state of maturity fit for converting into fiber, while in the torrid zone it takes only three and one-half years to come to the same stage.

In the tropics the period during which the sisal plant may be exploited for its leaves for fiber filament production is about five years, while in the sub-tropics the time for doing so is much prolonged and may exceed ten years.

Thus the advantage would seem to lie with such sources of supply as Yucatan, but there are other oft-setting factors which fairly balance the account. One of the most important of these is that in the tropics the plants yield many more and longer leaves, and a finer silkier filament, which commands in the market, an enhanced price. Thus today, despite the artificiality of prevailing conditions "tropical fiber" fetches about 20 per cent more money in the marts of the world than its sub-tropical rivals. One other outstanding factor favorable for the tropics is the cheapness and general reliability of labor conditions there with an advantage of as much as 50 per cent in some cases.

It is well to parry right here the contention which may be made that the dearer labor in the sub-tropics is much more efficient. This statement can be met with the observation that comparatively very few of the manipulations needed in fiber growing and scutching are of an arduous nature, requiring exceptional physical force. The heavier extra weeding necessary in the tropical plantations is invariably done by extraordinarily cheap woman and child labor. There is no "sweating," so-called, in these functions, simply because in the tropics the laborers can, and do, support life adequately at a money cost which would appear ridiculously small in the less fortunate sub-tropical regions.

A STRATEGIC LOCATION

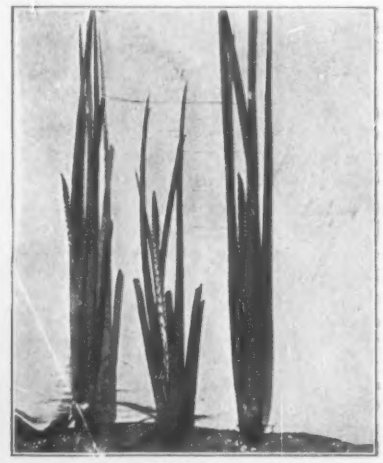
Let us now contemplate the "tropical field of operations" open to us in the largely virgin Western Hemisphere. It is not far to seek, and in fact many

FOURCROYA GIGANTRA, A CORDAGE FIBER PLANT 8 FEET HIGH

pioneers of note have given responsible opinions on it from time to time. It is the Northeastern seaboard of South America. There are others, but that is far and away the most important. It has vast contiguous areas available for planting-up in close proximity to tide-water, and good harbors on the main ocean highways, and freeholds are available at ridiculously cheap figures. Furthermore, that locality is THE HALF-WAY HOUSE BETWEEN THE WORLD'S GRANARIES IN NORTH AND SOUTH AMERICA; Canada and the United States on the one hand, and the Argentine and Chile on the other.

That means that if a comprehensive fiber industry is established at that strategic point, of such volume that it will be commercially practicable to set-up spinning and cordage mills directly on the seaboard, it will be feasible to distribute the various products to all parts of the commercial world needing the same. It may not be apparent to the general public that the distance from New York to that locality is not quite as far as to San Francisco, and that another eager and very potent customer at Buenos Ayres and Montevideo is not quite as distant as from New York to New Orleans. The carriage will be all by water too, which means transportation at less than one-eighth that of railroad freight rates.

There is, in fact, in those latitudes today an asset worth many millions of dollars in the shape of indigenous fibers (pita), which only awaits the advent of enterprise and energy to make it available. While the pita itself is pronounced of excellent quality, yet there are "scutching" difficulties in the way which have prevented a thorough try-out and experimental expenditure of capital. Meantime, being of the same



SANSEVIERIA VOLKENSI, MUCH USED BY AFRICANS FOR FISH LINES, ETC.

botanical species as our best commercial fiber plant, the Henequen Agave, it affords proof that the latter will find a congenial habitat there. This is definitely demonstrated by the presence, ubiquitously, of very many excellent specimens of the sisal agave all over the section from the coastlands up into the foothills a hundred miles inland.

FACTORS FAVORING THE DEVELOPMENT

In view of the important role which these cordage fibers play in our daily economics, the cost of a sizable fiber industry will not be found at all formidable. There are several favorable and compelling factors for engaging in it: First, the imperative need and demand for more fiber. Second, the lucrative

RINSING DECORTICATED SISAL FIBER

nature of the producing end of it; always assuming that it is conducted intelligently and energetically by a properly qualified management. In the

(*Continued on page* 211)

Systematic Crossbreeding of Sheep

The Production of Uniform Grades of Territory Wool—Producing More Wool with No More Sheep

By *W. T. Ritch*, American Wool Improvement Association

NEARLY four years ago the writer was requested to deliver a lecture on wool production in the West, to a large gathering of agricultural college students and range sheepmen at the University of Wyoming during "Short Course Week." Being discouraged at that time over the absence of any system of crossbreeding and the deplorable lack of uniformity in the grades of wool produced, in addition to the large proportion of wool of a nondescript character, he chose "Systematic Crossbreeding" as his subject. The system of crossbreeding which he attempted to describe was commenced in New Zealand about thirty years ago, and afterward spread to South America and other progressive wool growing countries.

As a regular system of crossbreeding was then unknown in the western states, the writer attempted to describe the correct system with the aid of a crude "kindergarten" chart especially drawn for that particular occasion. It consisted of a large piece of cardboard on which appeared a few colored discs and lines, quite unlike the usual geneological charts used for similar purposes. Greatly to his surprise the lecture was not only appreciated by the students, but made a deep impression on the wool growers present. Numerous requests were received for the lecture to be repeated elsewhere and reports appeared in some of the sheep journals.

TWO POUNDS MORE WOOL PER SHEEP

Eventually these lectures produced a movement for better methods of breeding, and, in several districts, systematic crossbreeding was adopted. The result of this system was quite apparent last shearing season when the hoggets or yearlings were shorn. In spite of the most severe winter on record in southern Wyoming, the hogget fleeces averaged nearly two pounds more wool per head than was produced by yearlings three seasons back. The general character of the wool also revealed a decided improvement in every detail, including less shrinkage, increased length of staple, more density, better crimp and more uniformity. The various grades, when placed in the bins by the wool classes, appeared more even and pleasing to the eye, and the former "patchwork" irregularity of each individual fleece was conspicuous by its absence. When the sample bales were opened and displayed in Boston last September, the general appearance of the hogget or yearling wool was so much superior to the wool produced by older ewes in the same flocks that it gave the impression of being a different clip from another district.

The writer now ventures to give a condensed description of the system of crossbreeding which produced the results referred to, with the object of bringing producers and manufacturers into closer touch. As more foreign than domestic wool is now used in this country, it is necessary that everyone in the wool business should be equally familiar with the foreign and American terms for the same grade, and also the way in which these grades are produced by the grower. The international terms for crossbred grades happen to be in harmony with the terms used in sheep husbandry, while the Boston terms are not. This is accounted for by the fact that the better informed foreign growers tried to produce what manufacturers required, whereas manufacturers in this country were obliged to take whatever the domestic grower produced in a haphazard way without any definite object in view. Owing to the absence of any clear understanding between growers and manufacturers in this country, certain arbitrary names were given to the various grades which were afterwards found to differ from foreign terms for similar wool possessing the same spinning qualities. The writer does not pretend to suggest any sudden change of existing wool terms, but merely desires a clearer understanding of such terms by everyone in the wool trade.

DESCRIPTION OF KINDERGARTEN CHART

This description of crossbreeding is illustrated by three charts: The "Graphic," indicating the various changes in crossbreeding according to the genealogical method; the "Kindergarten," indicating the same movements as originally explained to western wool growers; and the "Fleece" chart, showing the usual location of the various sorts or spinning qualities.

In order to trace the various movements in systematic crossbreeding on the "Kindergarten" chart it is first necessary to know what the markings and lines represent:

Horizontal lining of discs represents any of the longwooled breeds.

Crosshatching of discs represents any of the Merino breeds.

The horizontal and crosshatching combined represent regular crossbreds.

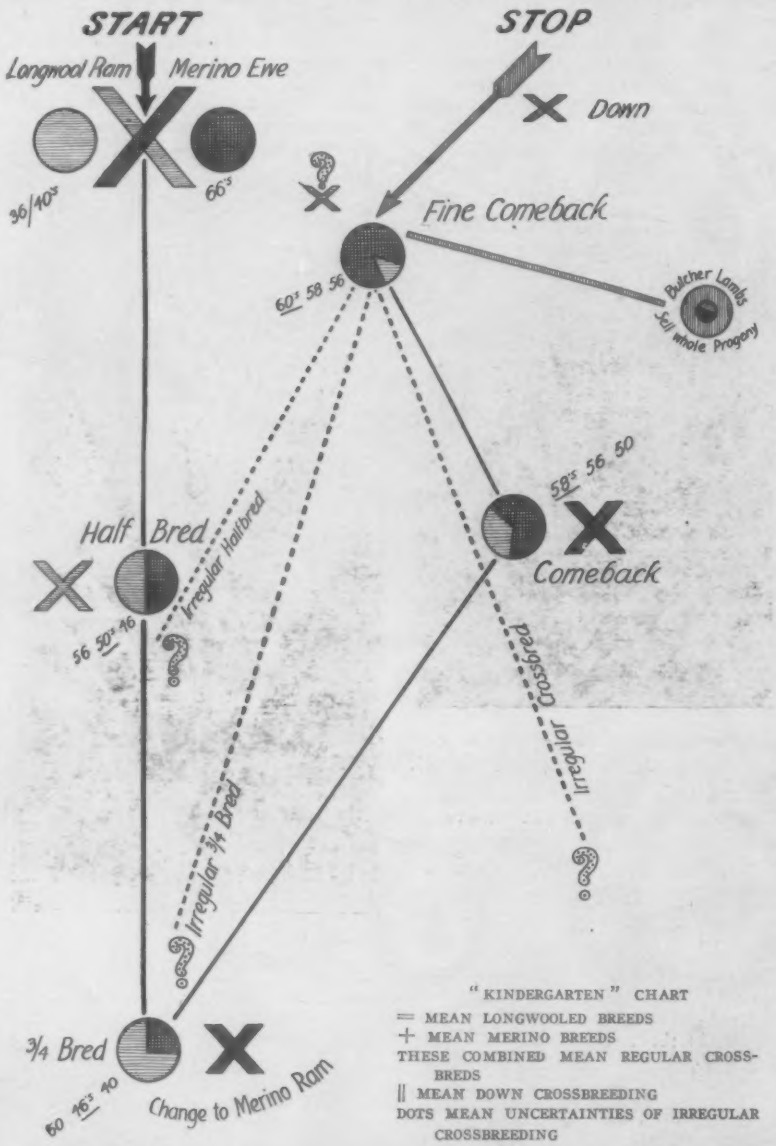
Vertical marks indicate down crossbreeding.

Dotted lines indicate uncertainties of irregular crossbreeding.

The horizontal lines and crosshatching on the discs indicate the proportion of long-wool and Merino characteristics in the fleece. The marking of the (X) indicates the kind of ram used for crossbreeding.

CORRECT OR REGULAR CROSSBREEDING

Correct crossbreeding is commenced by crossing a pure bred Merino ewe and a pure bred longwooled ram. Any breed of longwooled ram may be used, either Lincoln, Romney, Leicester or Cotswold.



"KINDERGARTEN" CHART

= MEAN LONGWOOLED BREEDS

+ MEAN MERINO BREEDS

THESE COMBINED MEAN REGULAR CROSSBREEDS

|| MEAN DOWN CROSSBREEDING

DOTS MEAN UNCERTAINTIES OF IRREGULAR CROSSBREEDING

The offspring of this cross is the halfbred (half longwool and half Merino blood). This halfbred ewe is mated with a longwooled ram and the offspring is a ¾-bred (three-quarters longwool and one-quarter Merino blood). Here is the usual limit for breeding towards the coarse wool, therefore a change is necessary for turning back towards the fine wool by crossing the ¾-bred ewe with a Merino ram. This is known as "comeback" crossbreeding, because it means coming back towards the merino. The offspring of this cross is called a "comeback" and it produces wool known in the trade by that name. This comeback ewe may be crossed with a Merino ram and the offspring would be a fine comeback. The flockowner now comes to the end of what is known as regular crossbreeding, because this fine comeback ewe is now as near to the Merino as it is desirable to go.

RESULTS TO BE AVOIDED

Up to this stage every move is regular, and brings the expected result with comparatively rare exceptions. Unfortunately it is not possible to go twice over the same ground in cross-breeding and obtain good results, therefore any one attempting it will meet with surprises and many disappointments. When this fine comeback ewe is crossed with a long-wooled ram, no one can foretell what the offspring will be like, beyond the fact that it will be an irregular crossbred of some description. Occasionally the offspring of this cross will resemble a halfbred with an irregular fleece and rather coarse wool on the britch. More frequently it will resemble an irregular three-quarter bred and rather open wooled. Very often the offspring of this cross will resemble none of the others and be of a nondescript character, known as an irregular crossbred. The fleece in this case is seriously lacking in density with weak wool over the loins and "patchy" on the hind quarters. This is known as "zig-zag" crossbreeding, and it has been discontinued by many careful breeders in other countries, because the results were unsatisfactory.

MUST SELL DOWN CROSSBRED EWE LAMBS

The question now arises, What is the best course to take after the four or five moves in regular crossbreeding? If possible, the best method is to keep nearly all the ewe lambs from the halfbred, three-quarter bred and comeback ewes, and keep no ewe lambs from the fine comeback ewe. In order to make the most of that ewe she should be crossed with a down ram, and the whole progeny sold to the butcher as lambs. Down crossbred ewe lambs should never be kept for crossbreeding on the range, but sold to small mixed farmers who depend more on mutton than on wool. This cross, however, makes a very profitable lamb, being quick maturing, firm and heavy at weaning time and, like all dark-faced lambs, favored by butchers on account of its superior quality. The fine comeback ewe retains a sound mouth two years longer than any of the other crossbreds, so that she yields two extra crops of lambs and two extra crops of wool to the range flock owner.

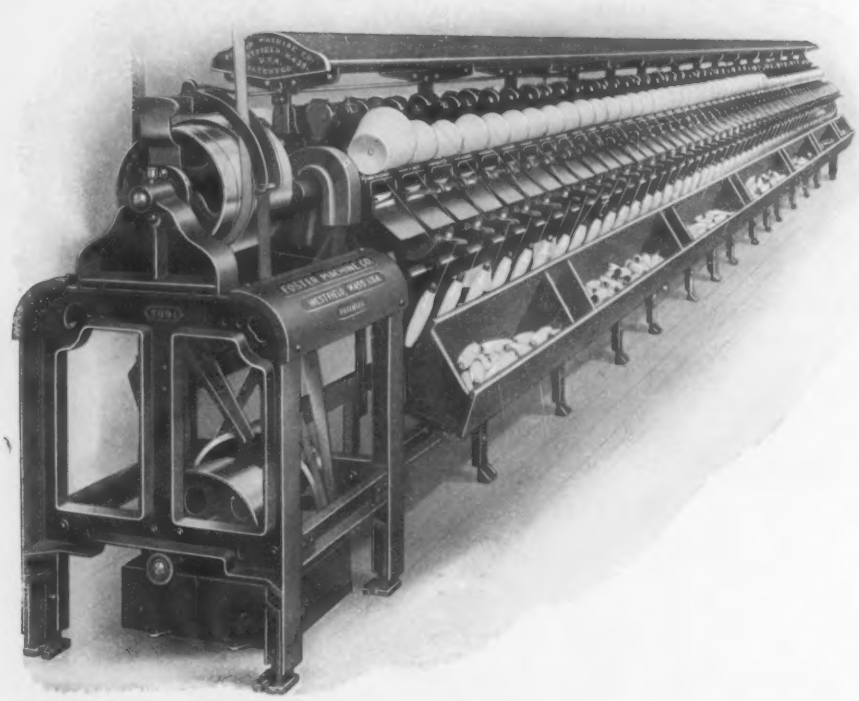
In order to keep the system of crossbreeding regular and the whole flock in first-rate condition, it is necessary to buy a few Merino ewes every two or three years. If breeders do not care to buy a few Merino ewes, they can buy a few straight halfbred young ewes instead.

THE VALUE OF THE CORRIEDALE

Having described one method of systematic crossbreeding, and the one which has been proved to be the most profitable in all progressive sheep countries, attention is called to a very simple method for those who prefer halfbreds and find the halfbred ewe most profitable on the range. Glance at the chart again and two crossbreds will be found near the center, one on the downward line and

(*Continued on page* 215)

CONE WINDING
TUBE WINDING
DOUBLING



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Cotton Goods Products Well Sold for Year

Civilian Economy Affects Certain Lines, But Government Demand Enormous

By *an Authority in the Trade*

THE main outstanding features of the cotton goods markets of 1916 were carried over into 1917. Export shipments ruled nearly three times above normal, new demands created through the shortage in linens and burlaps continued, and there was a steadily increasing call for cotton goods because they were cheaper than other textiles. The short supply in first hands at the beginning of the year, and the existence of many substantial contracts on mill books, were duplicated when the year closed. The new feature that developed rapidly after February 1, when Germany entered upon her campaign of unrestricted submarine warfare, was an immense demand for cotton goods of all kinds for government purposes, to be used in the conduct of war, which was formally declared by this country in April. So great and all-pervading did this demand become, that a very general economy in civilian consumption brought on by high prices and the need for thrift, did not lessen the general volume of business that rolled into the mills.

Greater profits for merchants, mill stockholders, and operatives were recorded, than had ever been known. It was not difficult to maintain a good working margin for manufacturers, as the relations of supply and demand were for the most part, wholly in favor of the seller. In whatever form the merchant conducted his business, whether by anticipation in placing long contracts, or in buying goods from hand to mouth through fear of reaction from the very high levels of value that ruled, he was able to turn over his merchandise promptly enough to keep his earnings on a high plane. Even in those instances where manufacturers lacked confidence in raw material values and followed a policy of covering each sale with a purchase of cotton, the rise in cloth prices was firm and steady enough to insure a good return to stockholders. Higher wages were paid to operatives than ever before, the average price of cotton ran above the records for forty-five years, and the shortage of labor was an ever present factor of annoyance. Yet in the face of these conditions, which would have caused shock within the industry in normal times, prosperity of an unequalled character was seen.

RAW MATERIAL CONDITIONS

The high total yield of cotton in 1914-15, over 16,000,000 bales, has been followed by three small crops, thus materially reducing the reserves of the world supply. The average price of the crop of 1916-17 was the highest known since Civil War days, somewhere around 19c. a pound, and this average promises to be greatly increased in the crop of 1917-18. On February 2 of this year, the day following the German submarine announcement, New York spot cotton was quoted at 14.30c., yet after all the uncertainties of war for our own country, and with the bulk of the world's supply within the United States, N. Y. spot cotton touched 31.25c. on November 26.

Hopes of a high yield for the current year were held very generally by merchants and manufacturers and were based upon a large acreage planted and a stimulating profit held out to the farmer. Many of them based their future operations in cloths and cotton on these hopes. A campaign of "18c. cotton" began in the late spring, yet a "bull" market sent prices up to 28c. in August, from a low of 19.60 in May. Soon after the condition report of early September was issued, the jobbing trade of the country began to change its views of the possible price of the staple, and manufacturers resigned themselves to whatever might come. The government entered upon a policy of fixing a price for cloths it needed, based upon cotton futures, and this relieved much of the manufacturing anxiety.

The culmination of hopes for even a fair average yield of cotton for spinning purposes came in October when a general and killing frost was reported all over the northern section of the growing belt, weeks in advance of the normal frost dates of the first week in November. From time to time there was a great deal of agitation in favor of governmental control of cotton and the fixing of a price on it. The government did control the exports, and it did fix prices on many cotton goods. But cotton is the one raw textile this country controls as other countries control silk, wool, jute and flax, and it has been left free, and subject to any and every normal market influence save one. The Cotton Exchange forbids its members to do many things tolerated in peace times.

LABOR CONDITIONS

In addition to many unsettling conditions affecting labor, noted a year ago, new ones in 1917 were the drafts, the National Child Labor Act, and the location of military training camps in or near textile manufacturing centers. It became necessary to abandon a great deal of night work in many mills as it was difficult to secure and hold working forces to maintain day operations in full.

Wage advances were insufficient to keep all operatives satisfied. In some southern centers, especially where duck mills were located near munition shops or training camps, advances of 50 per cent were made in the payrolls. Groups of mills in different sections of the South advanced wages 25 per cent, some by posting notices, others by making the advances as individual instances warranted. Inquiries made over the whole southern field showed wage advances rarely under 25 per cent last year, and frequently as high as 60 per cent.

In Fall River, where the wage basis for weaving print cloths had been 21.63c. per cut for the period from March 1912, to January 1916, the price paid after December 3 was 33½c. a cut, and a matter of 2½ per cent additional to be paid, was under arbitration. Many Massachusetts and other New England mills lifted wage payments 30 per cent from the fall of 9!6 to December 1917.

In the last half of the year, when war pressure began to cause an elimination of fancy production, a readjustment of labor conditions in some mills was made easier. But at no time was a surplus available in most centers, while at the South the labor outlook at the end of the year was disheartening. Production was not up to capacity, and there was a general feeling that as soon as spring planting begins the high profits in farming will draw many more operatives from the mills to the fields.

OTHER PRODUCING COSTS

The high costs of labor and raw material were supplemented by other high producing costs. In some sections of the country, before the government took over the coal production, prices went up threefold from a normal basis, and even at these figures it was not easy to secure supplies. New England found difficulty in getting coal at various times, while some of the southern mills suffered from shortage resulting from the commandeering of supplies by railroads, or for plants engaged in war work.

There was not much reduction in dyestuffs costs although supplies of certain kinds were satisfactory in the main. Belting, hardware supplies, burlap, and other items of cost were on a high level and it became necessary to figure in many factors of cost in sales that were not considered important before the war began. These things all had a strong influence toward inducing manufacturers to seek a higher margin of profit in their trading in the first part of the year. Later on, when it became clear that taxes were to cut a large figure in profits, it became evident that selling agents would have to consider them in placing values on all future products.

The improved financial conditions resulting from the profits of 1916 gave additional impetus among southern mill owners for reduced commissions for the sale of the product. Some very important changes in selling agencies were brought about as a consequence of this development, the purpose, as stated by manufacturers, being to lessen the fixed costs when financial assistance did not dictate accommodations found necessary in putting the goods on the market. There appears to be a new grouping of interests in many mill sections and this bids fair to be followed by the adoption of many reforms in methods of sale, payment, and shipping. It may well be, as some manufacturers predict, that a foundation is being laid for the exploitation of foreign trade by cotton mills, through agencies of sale more directly under the control of manufacturers.

SALES NOTE CHANGES

Progress of a definite character toward improving the practice of the trade in the issuing of sales notes in gray goods transaction began about the middle of the year and had made considerable headway at the close. The form adopted by the cotton manufacturers' associations was revived, and in a slightly amended form it was put into effect by some of the houses handling southern cotton goods exclusively.

The essential changes were that the term f. o. b., mill, was discarded and delivery at mill substituted; there was a clearing up of ideas concerning the rights given under the old proportionate delivery clause; it made contracts divisible in the sense that proportional deliveries could be made; it substantially adopted the definitions of variations and constructions of cloths recommended by the manufacturers' organizations, and it insisted that the purchaser should sign the sale note before contractual relations were fully recognized by the mill or its agent.

One of the results of the early attempts to have such a radical departure in sales notes adopted was a widespread recognition throughout the commission house district that a woeful lack of uniformity prevailed in trade practice. At this time some of the houses are working together to arrive at a common practice which will have the sanction and support of buyers as well as sellers and sufficient has already been accomplished to convince some groups of manufacturers that a repetition of the cancelation scandals of 1907-08 will not affect them in the event of a break down in conditions after the war, without at least giving them just power over the buyers' assets.

One of the features of trade conditions which impelled action on this matter was the refusal of railroads to accept merchandise pending a release of embargoes, and hence to issue bills of lading on which bills for the goods were normally predicated.

CHANGE IN PRODUCTION

A material change in the character of cotton mill production occurred as the year went on. Fine and fancy goods sold well in the first half of the year but the demand for economy was met by the abandonment of many forms of output not of an essential character. This was shown strikingly in New Bedford where mills were finally compelled to change some of their looms to coarser products, or to stop them altogether and find employment in manufacturing sale yarns, for which there was a good demand. Coarse and heavy products became very popular.

Many of the colored goods mills making cheviots, coverts, ginghams, and similar merchandise either cut down the number of patterns very much or they ceased producing standard goods because looms were taken up for government supplies. Drills were made in huge quantities. Sateens, twills, and ginghams were asked for in larger quantities than in normal years. One of the largest southern mills engaged on dobby fancies changed over nearly all of its looms to plain fabrics and made a profit in doing so. At Fall River, where two government orders for a total of 150,000,000 yards of bandage and hospital supply cloths were apportioned among the mills many looms were turned to them that had never made them before. Quilt and upholstery mills engaged in the manufacture of cotton duck. Yarn mills were called on to spin coarser numbers than usual and novelty yarns and novelty goods were abandoned very freely.

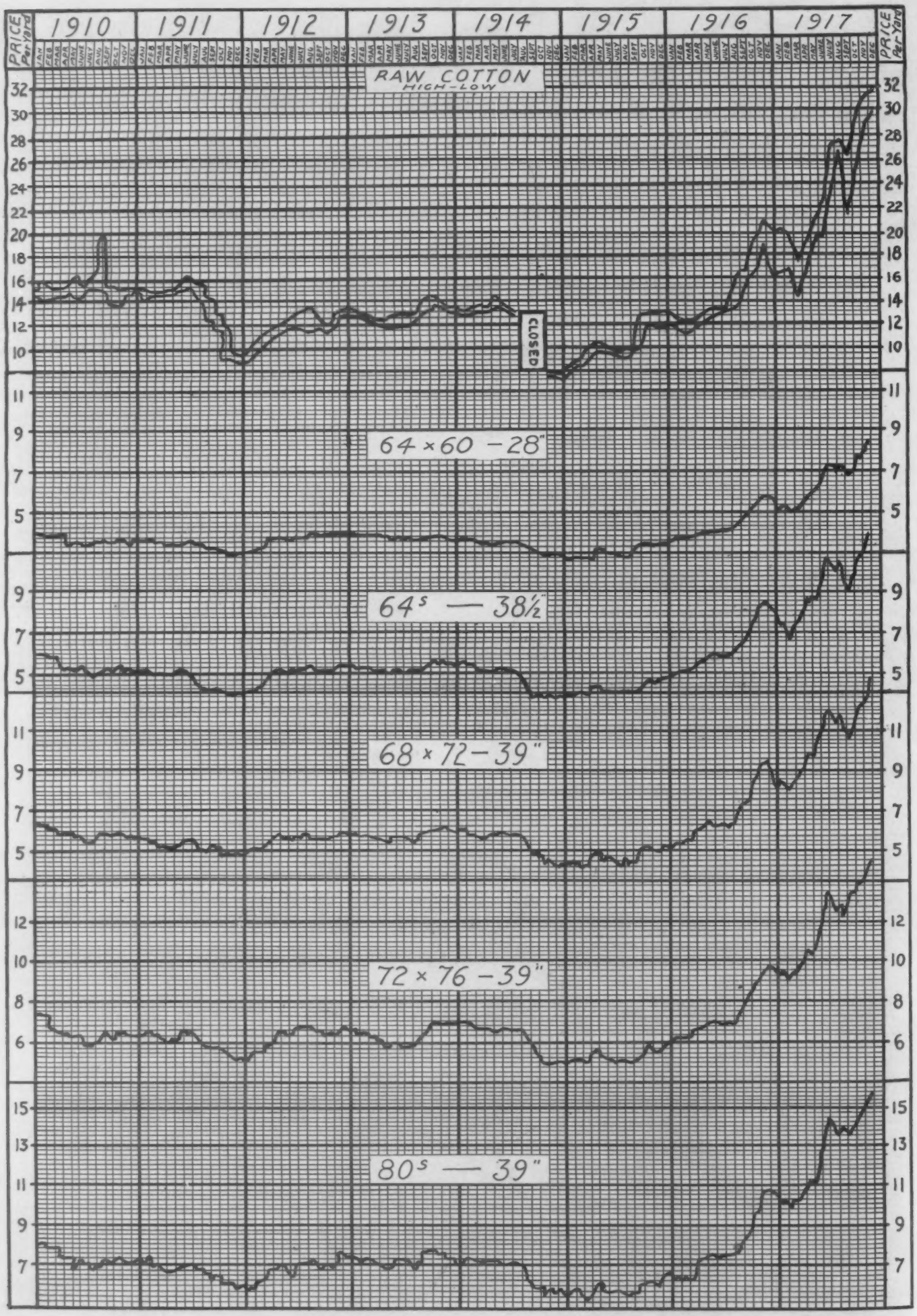
This development was unaccompanied with distress of any kind. In selling agencies, where export details had been growing very fast, the addition of changes in the character of the domestic output was met without strain. While there was always a tendency to keep up many of the substitute constructions of cloths to fit into a price condition, the trend of production was steadily toward very serviceable fabrics that would commend themselves to the consumer.

GOVERNMENT REQUIREMENTS

Soon after war with Germany became imminent the following committee of cotton goods merchants was appointed to co-operate with the Council of National Defense in supplying government and Red Cross requirements: Lincoln Grant, chairman; Spencer Turner, John E. Rousmaniere, William D. Judson, Fred S. Bennett, Fuller E. Calloway, H. L. Bailey, A. F. Bemis. Later in the year a reorganized committee was formed, as follows: Spencer Turner, chairman; Lincoln Grant, John E. Rousmaniere, William D. Judson, Ful-

PRICES OF RAW COTTON AND PRINT CLOTHS FROM 1910 TO 1917, INCLUSIVE

COMPILED BY TEXTILE WORLD JOURNAL FROM REPORTS OF ACTUAL SALES MADE IN THE NEW YORK MARKET.



ler E. Calloway, H. L. Bailey, Edwin Farnham Greene, J. Harper Poor, Elisha Cronkhite, W. S. Prankard, Ridley Watts, E. H. Hopkins, and George C. Riggs. An office was opened at 320 Broadway and the committee met daily for several weeks to assist in locating and pricing merchandise for presentation to the various purchasing boards. When this form of cooperation was abandoned the committee was dissolved as of December 1.

The demand from the government was not confined to fabrics but included garments of many kinds. A single order at the beginning of the work called for more duck of a single number to be delivered in three months than was normally produced in mills in a year. All sorts of fabrics, from gauzes and marquesettes for netting and bandages, to the heaviest qualities of 120-inch canvas, were called for. Before November 1, $250,000,000 worth of cotton goods had been purchased for the government, and by the end of the year it was estimated that the total government takings, and contracts, amounted to $500,000,000. Sixty per cent of a soldier's equipment consisted of cotton goods in some form. Uniform cloth, duck in every variety, webbing, towels, blankets, aprons, operating gowns, night shirts, pajamas, cooks' caps, sheets, pillow cases, mattress covers, denims for overalls, feed bags, etc., give some idea of what was asked for. Even four months after February 1, there were very few men in the trade who had formed a just conception of the volume of merchandise wanted or what the effect was sure to be on the civilian trade.

HOW MILLS WERE AFFECTED

Before the end of the year several of the largest manufacturing units in the country were shipping half their output for government purposes. Cotton duck mills were engaged fully to 80 per cent capacity up to November 1, and after that time no duck was sold to other than government workers except by permission of the Priorities Board. Looms formerly engaged on carpets, quilts, heavy worsteds, and upholstery fabrics, were pressed into service to supply cotton duck, and more than half the looms normally engaged for the automobile trade were switched over to government fabrics. The American Printing Company was turning out 300,000 yards a day of print cloth constructions for use for rubberizing purposes. Some of the large branches of the U. S. Finishing Company were doing nothing but government work. The Amoskeag Company, that hadn't a Government order on its books on Jan. 1, was at work in various departments to at least 40 per cent. for the Government, orders, as large as 10,000,000 and 15,000,000 yards being taken for khaki uniforms, shirtings, pajama cloths, etc.

Every available loom in the Pepperell Company was turned over to the production of drills, twills, sheetings, etc. Some of the southern mills were virtually taken over by the government, as all work in them was made subject to the rule that 100 per cent efficiency for government deliveries should obtain, regardless of any civilian orders in work. More than half the looms of the Cone mills were at work on denims or other cloths wanted. At the end of the year, half the output of the Tremont and Suffolk mills was reported as engaged either for the government or Red Cross needs.

These are only random instances of the overturning of production that occurred in some well-known plants. So far as can be seen at this time, while government demands have been well met, it seems as if a much larger percentage of the output will be called for before the proposed 5,000,000 army can be taken care of.

COTTON DUCK PRODUCTS

About the first of November, 1916, the duck list was advanced 20 per cent. By July 9, of 1917, an advance of 100 per cent was announced. Civilians were nonplussed by the price and did not operate very freely. By the end of the year they were willing to pay full list prices for sail duck and some other goods that were not to be had from mills. The policy pursued by the government varied greatly as purchasing increased. One early proposition was to take over the whole product paying 10 per cent in excess of costs. Later on a plan was arrived at whereby a price of 45 per cent off the list was offered, and 47½ per cent finally accepted for many of the army needs. The navy came in later on for certain light weight duck at 50 per cent off, virtually ordering mills to take the business under the new law enacted when the war began. This price was made subject to increase if an investigation disclosed its unfairness.

In order to protect mills against advances in cotton and labor during the life of contracts, arrangements were made on many contracts setting a price for the cloth, based upon the price of future cotton. If a wage advance were forced, a readjustment of the price on a new basis was provided for. When it was found that it was the disposition of the purchasing authorities to protect the mills and stimulate production, little difficulty was experienced in having orders accepted and the work undertaken with a will.

Just what is meant by the present level of value in cotton duck may be seen from a comparison with what cotton duck sold for 20 years or more ago. About 1895 a duck list quoted 22 inch No. 4 sail duck at 19c. a yard, and No. 3 at 20c. The current duck list prices No. 4 at 98c., 72c. a yard up, and No. 3 at $1.02, or 82c. up. While these prices seem extravagant, there were times in the last quarter of the year when jobbers would have paid the full list for prompt deliveries.

NAPPED FABRICS' PRICES HIGH

The story of the napped cotton goods market is told to a business man when it is stated that a flannelette that was priced 9½c. at the beginning of the year, sold on December 1 at 18½c. for odd case lots and mill run out, before a formal pricing for the fall 1918 season. The large cotton blanket mills were so denuded of stock and so well sold for the first few months of the new year, that only one half the normal output could be offered for civilian trade for fall 1918, and yet everything offered was taken at advances ranging from 60 to 70 per cent over the prices at the opening of 1917.

Plain and fancy domets were wanted by Red Cross and other agencies, and many were wanted for export. Jobbers' stocks and mills' stocks were depleted before the year end and many contracts were made to extend into May before any price could be named for fall delivery and dating. Cotton blankets were used very largely in cantonments, waiting stations, and wherever soldiers were not in the fields. The high price and scarcity of wool blankets led to larger purchases than usual for home use. When neither wool nor cotton blankets could be obtained, comfortables were bought for the government for hospital and camp use.

In order to enhance the output of mills it was decided to limit the number of styles made in both blankets and flannelettes. The 36-inch flannels for the cutting trade were priced for the new season in November and were sold at advances averaging about 65 per cent over the figures of fall 1917 season, in as large quantities as mills could accept orders. The situation at the opening of 1918 is that the largest producers have more bona fide orders on their books than ever before in their history and most of them do not expect to be able to take care of what they expect will be a contracted civilian demand.

REMARKABLE GINGHAM YEAR

The year turned out to be the most remarkable ever known in the gingham trade. Staple ginghams opened the season at 9½c. a yard, and closed at 17½c. for the checks, and 18c. for the solid colors. The dress ginghams that sell in ordinary years around 7½c. a yard, subject to discount, brought 17½c. net at the year end for spring delivery. This latter price was named in October after a 16½c. price for the spring opening of 1917 was announced, in August. Bates ginghams were priced for fall 1918 delivery at 22½c. and 23½c., while a 32-inch cloth made by the same mill was priced at 25c. a yard.

These conditions resulted from a demand for gingham induced by style in part, and by the belief among consumers that they were as serviceable as any cottons to be used in war times. Throughout the year ginghams were worn more freely than for several years and the mills were carrying lighter stocks than at any time in ten years. Nevertheless, agents were not prepared for the great volume of business that came forward in July, August, and September. One factor of interest that helped the domestic trade was the inability of foreign manufacturers to send ginghams in here freely. Many of the importers had featured domestic lines for some time, but were not really cramped in getting foreign goods until the middle of 1917.

The prices secured for ginghams at retail were fanciful. Goods of the AFC grade sold at retail for 35c. a yard in a number of stores. Some of the Fifth Avenue retailers featured summer dresses of gingham at $25 each, and the cloths used formerly sold in primary markets at 9c. a yard. Toward the end of the year the Amoskeag Company took the trade by surprise by showing a line of fine plaids on 19,000 range cloth at 25c. net, in 32-inch widths. This was the cloth that made "blue chambray" working shirts popular, and it sold about 3½ years ago at 6½c. a yard.

NEW PRINT AND PERCALE LINES

Standard prints opened the year at 9c. and closed at 13c. A standard percale, 4-4 64s, opened the year at 10½c. and closed at 14½c. The greater part of the trade done in arrow prints was for export, the American sending 25 per cent of its output abroad, and the Algonquin Company something over 50 per cent. There was a decidedly large business done with Mexico and there was also a decided increase in the distribution of narrow prints in this country. In the last half of the year many of the printers offered gingham styles on staple cloths and sold them very freely, as it was impossible to secure all the woven ginghams asked for.

The shirting business declined, especially in the last half of the year, when young men began going into the army in large numbers. This applied as well to woven as to printed lines, however, yet there were times when the printers of shirting percale could sell more than they cared to. The business of most of the printers was of a miscellaneous character. As stated, a large part of the American works was devoted to the production of ground cloths for slickers, while many other printers did a large business in cretonnes for knitting bags and other purposes.

The printing of fine goods for dress purposes was of lighter volume than last year, and there were periods when some of the job printers had hardly 50 per cent of capacity work in hand. Some of the printers revived printed flannelettes, and the business in them grew very large toward the end of the year. It seems at this time as that feature of the printing business is in for a general revival. There was considerable double printing work done on suiting fabrics for wool finished goods, this demand being brought on by the very high prices asked for many low end woolens and worsteds. The volume of business done on printed lawns, batistes and dimities was relatively small, despite the fact that the ground cloths were relatively cheaper than almost any other goods on the market.

BLEACHED GOODS TRADE LARGE

Bleached goods enjoyed a full year as a whole. There were times when business was light, but as forward orders were large, most of the bleachers maintained a very full volume of output. One of the great difficulties was in getting or in holding bleached goods help, although wage advances were sometimes of monthly occurrence. The volume of bleached goods sold for export ran ahead of a year ago.

Standard jobbing house brands of the Fruit of the Loom class reached a price level of 18c. a yard, the opening having been at 12c. There was a large call for goods of this character for hospital and Red Cross purposes, for rubberizing, etc. Longcloths, nainsooks, and fine cambrics sold very freely, and the business done in India linons was better as a whole than in the preceding year. Underwear manufacturers used more bleached goods than in 1916.

The demand for wide sheetings, sheets, pillow cases, and pillow tubings was enormous. For a standard 10-4 sheeting the price reached 55c. a yard, the opening price being 35c., and there being no recession at any time. One of the better known common grades of sheets sold for $16.68 a dozen, the previous high prices for such goods being $12.20. That was nearly $1.50 higher than the opening price for the year. A southern 45-inch pillow tubing brought 27½c. a yard at the end of the year and was sold for 19c. in March.

The most active part of the year on goods of this class was in the period from April till August, so far as price advances went, but there was a time, from October through November, when the demand was overwhelming. Supplies for civilian purposes are certain to be light for some time. Sheets in widths from 63 to 72 inches were virtually off the primary market for weeks at a time owing to the great demand growing out of the war.

GRAY GOODS ACTIVE

There were a few periods of the year when there were lulls in gray goods trading. They were so greatly offset by the periods of activity that, looking back over the year as a whole, the figures show an almost continuous rise. The first five weeks of the year were quiet, there was a spell of hesitation in July, and another in the last weeks of August, the first week in September, and the last two or three weeks of the year. But there was no time when the recession exceeded 10 per cent from very feverish high levels, and the total rise of the year on some staple fabrics ran up to 60 and 65 per cent above the opening prices.

Efforts were made to check speculative buying, and some commission houses deliberately declined to sell to factors who were known to be purchasing in excess of ordinary requirements. Nevertheless there was a great deal of profitable speculation in gray goods at different times and it had its natural effect in making sellers more guarded than usual in accepting contracts. One of the interesting features of the year was the active inquiry that set in for sateens. These goods had been quiet for months. The converters seemed to realize about the same time that the mills were not making normal quantities, and there followed a feverish hunt for spots that sent prices far above the range of other goods made from print cloth yarns.

In the same way, when it became known that the government was a large buyer of thin goods for hospital purposes, converters began buying the thin constructions liberally. On the other hand it was a very quiet year in umbrella cloths, shade cloths, and some other specialties. It was a year when supply and demand conditions for cloths were more potent and apparent influences in the market than at any time in recent years, a number of instances occurring where goods went up while cotton was trembling or declining.

GREAT YEAR ON SHEETINGS

It was a phenomenal year in the brown sheeting trade. The bag manufacturers were very large users throughout the year, and were particularly feverish buyers in the last quarter of the year when the normal burlap supply ran short. This was brought about by the difficulties in exchange and shipping, and the commandeering of burlap supplies for the British Government. The heavy weight goods were in enormous demand. Many looms were diverted to drills or to other than normal purposes, and this led to a scarcity that was not fully appreciated in the first half of the year.

A common 4-yard 48 square sheeting that opened the year at 9c. a yard, and at no time sold under 8¼c., sold as high as 14½c. for contract delivery running well into 1918. The standard 4-yard 56x60s sold in a large way for contract delivery at 14½c. before the year closed, and spots brought as high as 15¼c. The 4.25 yard and 2.85 yard sheetings were very large sellers in the bag trade. The standard 3-yard sheetings that were called exceedingly high at 8c. in the active trading for China shipment in 1905-06, sold at the end of the year in scattered lots at 19¼c. for spot shipment. For a time, such a common jobbing trade cloth as the 4.70 sheetings could not be had in carload lots for spot shipment from first hands.

There was a very large use of 2.35, 2.50 and 2.75 yard goods, a price as high as 22c. having been paid for some 2.50 goods by eager buyers. At the close of immense buying in the last quarter of the year some mills were sold up on certain grades for delivery throughout the cotton year of 1917-1918 at prices unknown in the trade for 45 years or more. Osnaburgs that sold at 8½c. in December of 1916 sold at 14¾c. in December, 1917. A very ordinary grade of 2.50 sheeting that sold at 13c. in December of 1916 sold at 21½c. in the early part of December, 1917. Most sheeting mills are now sold ahead from four to six months.

DENIMS AND TICKINGS FOR GOVERNMENT

Denims, tickings, and other heavy colored cotton goods were wanted so largely by the government or for some sort of war supplies, that civilians were forced to accept allotments of product for months before the end of the year. Synthetic indigo is still not being made in commercial quantities in this country but soon will be. The demand for blue denims for overalls was far in excess of supplies. The government had use for large quantities of brown overall goods and used them when blue goods were unobtainable. The largest manufacturers did not pretend to take on new trade. A 2.20 southern indo sold at 28½c. in a large way for contract delivery in the latter part of the year and spot goods brought as high as 32½c. A choice eastern denims in 9 oz. weights sold at 50c. a yard for the accommodation of one or two customers whose business depended on the use of a branded line, while in normal years this grade was called high at 17c.

The government used large quantities of tickings for mattress covers or they used cloths to be produced on ticking looms. For this reason, there was a constant shortage of standard tickings in the trade and the production of fancy tickings was discontinued, partly because of their high cost, and again because mills found so much work on the plainer goods. A standard 8 oz. ticking, eastern make, sold for months at 35c., and was at value at that figure for the last six or eight weeks of the year.

Fancy coverts, suiting fabrics, and similar merchandise, were made in diminishing quantities. Some of the standard cheviots in pin-check patterns were much wanted but no mill could supply the demand. The government was forced at one time to take black pinchecks because the blue goods were unavailable in either first or second hands. Colored duck was pre-empted for all practical purposes by the government and civilian needs could not be met. Of course all khaki drills were wanted either by the government or by those who were engaged on uniform materials.

FANCY COTTONS RESTRICTED

These goods were affected directly by the economy phase of war time demands. Many conventional cloths went from the looms and will disappear from trade very soon in any large way until the war is over. There was a steady demand for poplins, printed, piece dyed, and white, for pongees, gabardines and some of the quality madrases. The better qualities of voiles were sold well. But a great many of the cheap fancy voiles, cheap waisting fabrics, and fancy shirtings, were ordered in limited quantities after the early contracts were filled. A price comparison of combed yarn goods made at the end of the year showed that prices hardly underwent a 10 per cent change for the twelve months on the plainer goods, while in the same time some sheetings doubled in price, and print cloth yarn goods enhanced 70 per cent in value.

This anomalous situation may be righted by demands that began to come to the front in the last two months of the year for balloon cloths, aeroplane wings, and other aviation fabrics, where great strength and light weights are wanted. It is also believed that there will be a revival shortly of the demand for the fine quality printed lawns and batistes, that are extremely serviceable fabrics for summer wear and will be found useful in taking the place of many of the low grade silks.

Owing to the exceedingly high cost of long staple cotton, and the constant rise of costs of production, declines in the values of fine goods in mill centers did not occur. Mills preferred to stop their looms rather than accept business at a loss, and as there was plenty of opportunity to sell yarns profitably, the actual mill losses were negligible. In fact some of the fine goods mills did almost as well as they did in 1916. Some of them are so elastic in their equipment that it was possible for them to adapt themselves to the production of sateens, and thin goods of print cloth yarns that have been in persistent demand.

LOOKING TO THE FUTURE

Cotton goods merchants are wary of making predictions for 1918. It is already apparent that cotton shortage is possible while southern labor and high grade fertilizer remain scarce. Yet the consumption of cotton at home promises to be large because so many heavy weight yarns and goods are being made and because the government demands are of such a huge character. Labor scarcity and high wage demands are anticipated, and the margin of profit will be materially reduced by heavy taxation for war purposes.

There is also imminent the possibility of a closer government control of production, and possibly some mischievous price fixing of both cotton and cloth. Financial conditions are not going to grow better as the war progresses and the plethoric surpluses of past years cannot accumulate. Directly and indirectly there will be a demand for the elimination of fabric production not essential in the winning of the war. English production has fallen to two-thirds of normal. Export trade may be contracted by necessary regulation to guard against trading with the enemy. There are two factors that have a bearing on the possibility of expansion in cotton goods export trade, yet predictions on the outcome must be in the nature of guesswork.

What is very clear at this time is that the mills are as well or better sold ahead than they were a year ago, the new factor of restricted consumption due to economy as well as to high prices is becoming more potent, the jobbing and converting trades will be compelled by financial necessity to restrict the size of their stocks, and at current values there will be little or no inducement for mills to manufacture save on order. The stock sheets may remain clean, but the character of the demand for cotton mill products seems on the verge of another great change.

Future of Foreign Trade in Textiles

Belief in Possibility of Extending American with Proper Attention

By *E. B. Filsinger,* with Export Department of Lawrence & Co.

THE United States has been at war a little over nine months. In that short period there have been amazing changes in our commercial structure. Our methods of manufacturing and distribution are being revolutionized. In exporting remarkable advances are being made. But astounding as these developments have been, the effect of the war on American commerce during the next six or eight months will be even more marked. This applies with particular force to the cotton manufacturing industry.

In order to determine the possibilities of the future, the general problem of textile exports may be considered from five standpoints: 1. The immediate outlook—the prospects of the industry in the near future. 2. The attitude of the Government—its duty toward business men 3. The effect of peace. 4. After-war competition. 5. Preparations to meet after-war conditions.

The textile interests face a remarkable situation. Jan. 1, 1918, finds most mills with their output sold far in advance. While a large percentage of the production is required for Government needs, a considerable volume is needed to supply the demand for civilian purposes. This demand is a healthy one—stocks in general not being large; on the other hand, the prosperity which prevails generally throughout the country will be further enhanced by war activities.

It is true that there has been some buying in anticipation of the scarcity of merchandise. It is also possible that there may be a greater effort within the next month or two to anticipate possible delays in deliveries on the part of the mills. In some quarters it is believed that slowness in delivery will be accentuated shortly, and that outputs will be even further reduced as a result of the second draft.

DRAFT—COAL—LABOR

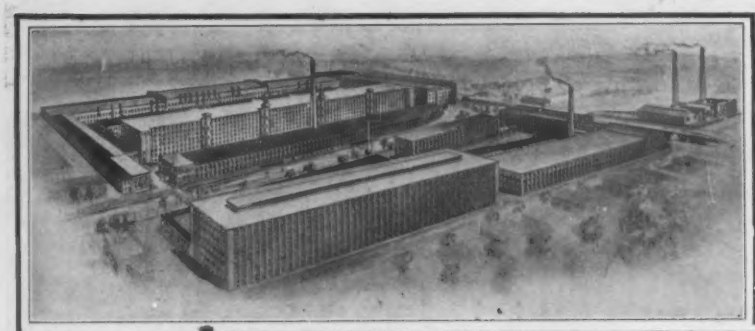
The coal situation is acute. In well-informed quarters it is believed that the Government will adopt a more stringent attitude than in the past in limiting supplies of coal to industries of prime necessity. Mills which have Government contracts are practically assured of sufficient coal: those which have no Government business may not be so fortunate. However, it will probably be some time before the situation becomes so serious that the production of textiles need be curtailed on the basis of "eliminating luxuries." Other lines of industry are far more likely to suffer first.

The effect of the draft will probably be felt much sooner. In many sections the shortage of labor is already affecting production, and strenuous efforts will be made by some manufacturers to prevent the depletion of their forces by the action of the draft. The questionnaire submitted by the War Department to the drafted men will undoubtedly have an excellent practical value, if wise use is made of the information obtained. It is to be hoped that the board charged with the duties of exemption will have sufficient vision not to cripple industries which are vital to the well-being of the nation. In this connection, those manufacturers who produce for export should have especial consideration. The need for export in order to maintain our gold reserves and exchange values will become increasingly greater as the war progresses.

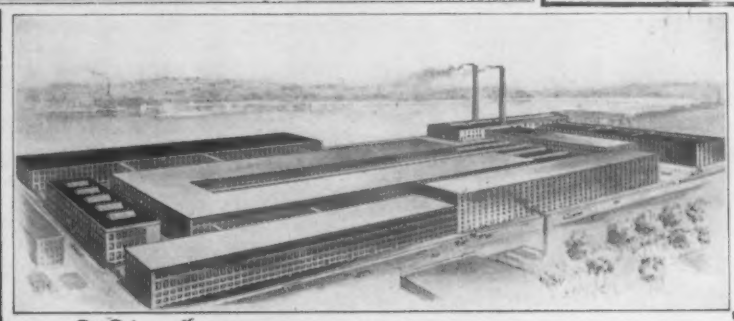
The number of women workers is increasing. If the war continues for any length of time the number of that sex engaged in industry must show a growth. The experience of English mill owners (recently reported by an American Consul) will probably be duplicated in the United States. Many of the British mill owners found that the women did the work satisfactorily, although they would have preferred men. The quality of the results obtainable by the use of female labor seems largely dependent upon the character of the management. Certain mill owners announce their intention of retaining women after the war ceases.

ATTITUDE OF THE GOVERNMENT

The demand for a broad and intelligent outlook on the part of government officials was never greater. Upon the decisions of the War Trade Board, and the other official bodies which meet in Washington, will depend, to a great extent, the future prosperity of numerous industries. Especially is thus true of the textile industry. This applies with particular force to those manufacturers who export a large share of their output. The need of an intelligent export policy is emphasized by the shipment, within the last few days, of almost a million dollars in gold to the Republic

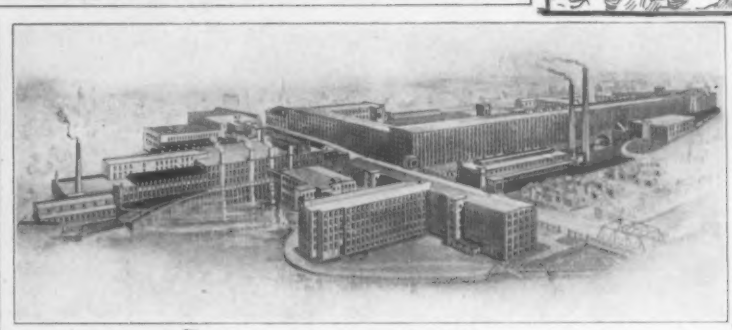


Cotton Department
LAWRENCE MASS.



Print Works Department
LAWRENCE MASS.

Worsted Department
LAWRENCE MASS.



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VIEW OF THE AMOSKEAG MILLS ON EAST BANK OF MERRIMACK RIVER

LOOMS	24,400	Pounds of Cotton Consumed per annum	54,600,000
SPINDLES	670,000	Pounds of Wool Consumed per annum	15,300,000
EMPLOYEES	16,500	Yards of Cloth Woven per annum	258,930,360

Invincible Suiting
A F C Ginghams
Utility Ginghams
Romper Cloth
Staple Ginghams
Seersuckers
Shirtings
Chambrays
Bleached Madras

1921 Cloth
Panola Cloth
Daisy Cloth
Fleecedown
Teazle Down
Tunis Cloth
Clover Cloth
Iris Cloth
Smyrna Cloth

Pamela Cloth
Tacuna Cloth
Ponceta Cloth
Trinada Cloth
36-in. Plain
and Fancy Flannel
Denims & Tickings
Bleached Goods
Grey Goods & Bags

WORSTED DRESS GOODS

Serges

Panamas

Vigoureux Mixtures

of Chile. Had our exports to that country been sufficiently large, such a shipment would not have been necessary.

It is of vital importance that our exports should not be curtailed, therefore, except in so far as the articles or commodities concerned are of use in winning the war. We cannot afford to export our gold. Our reserve of that metal must be maintained in any event. The danger of inflation is omnipresent, and it will become infinitely more so if it becomes necessary to pay for our raw materials such as nitrate, cotton, etc., with gold.

As an example, we may take South America. We buy from that continent millions of dollars of raw products. Of these, during the last twelve months, enormous quantities were of vital necessity in conducting the war. The ships which brought them here should be loaded to the guards with manufactured products when they depart for South America.

This matter has a political aspect also. To maintain the good will of Latin America, it is incumbent upon us to find markets (to the greatest extent possible) for her raw materials; the conduct of the world war practically forces this duty upon us. We can prevent much antagonism on the part of South Americans by capably discharging this duty.

GOVERNMENT SHOULD ENCOURAGE EXPORTING

The situation requires the utmost consideration on the part of the Government for business men who can "do their bit" in this way to help win the war. Every possible handicap to exporters should be avoided. "Red tape" should be minimized. An improvement in this direction has been noted and it is to be hoped that before long the procedure will be even more simple.

Business men should be encouraged, as never before, to develop foreign markets. The wisdom of this policy cannot be challenged. If necessary, sales at home should be curtailed for the purpose of making exporting possible. This applies with especial force to textiles and is particularly important to those countries from whom we buy heavily. To such countries, naturally, there is a greater amount of tonnage available than to other regions of the world, and we should lose no opportunity to stimulate business there.

GOVERNMENTAL POLICY TOWARDS EXPORTS

American textile manufacturers have never had export opportunities equal to those of the present. By a peculiar combination of circumstances, much of the world which has heretofore been dependent upon England, France, Belgium, and our enemies, is forced to turn to the United States for its supplies. The demand for American textiles during the next twelve or eighteen months, will be acute.

If peace does not come by July, 1918, much of the world will be dependent upon the United States. The present opportunities will, in large degree, be lost to textile manufacturers unless they have the heartiest co-operation on the part of the Government.

The need for a wise, broad-minded, constructive policy is a crying one. It applies particularly to the programme of conservation. Every aid should be given manufacturers to introduce their wares into the new world markets. Merchandise, if introduced only in small quantities now, may find an increasing sale after the war. Urgent necessity will overcome obstacles on the part of foreign buyers which in peace times would be insuperable. The Government should give the greatest encouragement to the policy of obtaining such introductory business. For this is needed a very broad-minded, intelligent administration of the "conservation laws."

The present condition will not last indefinitely. It will disappear practically as soon as sufficient tonnage is available for other nations to again export. The necessity of haste is, therefore, apparent. Acting as individuals, wise manufacturers will, as a duty to the nation, stretch a point to place their products, even in limited quantities in the hands of those merchants throughout the world who have developed an interest in American goods. The domestic market will always be ours. It can be safeguarded by proper methods of protection after the war. But the present opportunity to gain a firm foothold in foreign markets must not be lost.

THE EFFECT OF PEACE

The exports of textiles during the last few years have shown a tremendous increase. Is this business permanently ours? In my opinion we can not only hold much of it, but in many instances it can be materially enlarged. There is absolutely no doubt that to certain specific countries we shall be able to greatly increase our exports. This is particularly true of some of the countries in Europe where, for a few years after the war, we shall do a very large business. This will certainly be true until such time as their own mills are re-established on a normal basis of production.

There is also no doubt that certain of our products, because of their individuality of design, finish, etc., will have a permanent sale, even in fields which would ordinarily not be considered practicable. The introduction of these goods by stress of circumstances has convinced importers of the possibilities of their regular sale because of the satisfaction given to the consumers. This is certainly true of Greece, Scandinavia, Siberia and parts of Russia. In these countries, particularly in Siberia and Scandinavia, we may look for a continuous trade for many years to come. In the Far East also, including the Dutch East Indies and the Straits Settlements, our business is taking on a permanent character. I have no reason to modify the statement I made a year ago that the exports of American textiles may easily reach two hundred millions of dollars annually under purely normal conditions. On the contrary, I believe that I have been modest in my estimates.

AFTER-WAR COMPETITION

We must not, however, delude ourselves into the belief that the holding and further increase of this trade will be an easy task. It is my firm opinion that we are entering upon a period of the keenest competition in the world's history. This competition will be heightened by the fact that all the nations at war have had their processes of manufacture stimulated by war-time needs. All of them are doing things better and more quickly than before the war. While wages in Europe will be higher, it is still a question whether they have advanced in the same proportion as those in the United States, which began on a much higher basis. Consequently, we shall be forced to use all our energy, organizing ability, and skill in distribution to meet the conditions which will be imposed by our European competitors and those in the rapidly developing countries of South America. However, I am not pessimistic as to the outcome, particularly if we apply ourselves to the new problems with the same intelligence and diligence as our co-belligerents have done. One of our new weapons which we can use most advantageously is the Webb law.

Our chief consideration to-day is to win the war. This we should do by taking advantage of every possible factor. We could well afford, in this country, to pay more attention to psychological processes. We should not hesitate, by dignified and honest propaganda, to show the justice of the American cause. We must leave no doubt in the minds of any one as to the uprightness of our motives. We should take a firm stand throughout the world for justice and for American rights. No nation or business interest anywhere should be permitted to question our liberty of action. In this connection, we have much to learn from the powers in the Entente, of the value of organs to set ourselves fairly before the world. We must use propaganda where propaganda of the right sort will help us.

GERMANY MUST BE DEFEATED

Economic pressure may bring the war to an earlier close than if it were not applied. Everything that Americans can do to defeat Germany commercially should be done, and in the most effective way.

Our aim is to smash the German system of government and to bring about such changes that Germany may again become one of the family of nations. As soon as Germany's eventual defeat is certain, this inevitable "smash-up" occurs, and the Government is reorganized along the lines laid down by President Wilson, peace will become possible. Under those conditions we shall again have to reckon with a German commercial organization which will become a formidable rival for a share of the commerce of the world.

To this we must not blind ourselves. A reorganized Germany will offer serious competition. The German houses throughout the world, many of whom are now on the "Black List," will be again able to purchase in Germany and will have a greater incentive for making purchases there than ever before. Knowing that we shall certainly defeat Germany it is wisdom to prepare for that inevitable competition which will follow. Only the cocksure American will dismiss this matter without consideration.

INTENSIVE INSTRUCTION AND RESEARCH

Under the new order of things, the necessity for research and intensive methods will be emphasized. The necessity for highly trained men will become increasingly greater. This is a problem which should engage the earnest attention of every textile manufacturer. In England great sums are already being set aside for research. In France schools for export training along the lines of "continuation schools" for workers, are already established. In all of the belligerent countries schemes for the preparation of men are under way.

Opportunities should be given our young men who wish to avail themselves of export trade possibilities, to develop along the most logical lines. Schools should be established, supported in part by the manufacturers, commercial organizations and trade bodies, and in part by the state or national government. The training should take place for a number of years and begin very early in the life of the young men. Most of the training that is offered to-day is of an extremely superficial character and inconsistent with the necessities of the hour. The more intensive methods could easily be put into practice without great expense or delay.

American business interests, in the great struggle for world trade which is to follow the present war, should not be at a disadvantage by having an insufficient number of well trained young men to send to the commercial battle front. The present world-war has surely demonstrated the advantage of preparedness.

Southern Cotton Mill Progress

Investment in Southern Facilities for Cotton Spinning and Weaving, Exceeds $13,000,000

By *Our Regular Correspondent*

MORE than $13,000,000 is the estimated amount of money expended by the Southern cotton manufacturers during 1917 for adding to the millions of spindles and looms already in position in the nearly 900 cotton mills of the South. These manufacturers completed arrangements for the addition of 525,000 spindles and 16,500 looms to the South's quota during the twelve months of last year, these installations being largely ordered by companies already in existence and conducting prosperous cotton manufacturing enterprises in the cotton-growing States. Of the more than $13,000,000 referred to, there was a total of $2,910,000 required for 118,500 spindles and 4,800 looms contracted for by 26 established concerns, while $10,200,000 was the investment of 16 new enterprises tor their plants of 407,000 spindles and 11,700 looms.

These figures show gratifying progress in Southern cotton manufacture. They are in excess of the figures resulting from the activities of 1916 and 1915 and of many other past years since the Southern cotton manufacturing industry began its forward movement, which included the manufacture of the finer grades of cotton cloth, the development of waterpowers for generating electricity for power and lighting in the mills, and the large consumption of the cotton crop.

IMPETUS OF WAR ORDERS

During 1916 there was considerable timidity displayed, by capitalists and cotton manufacturers, which resulted in a cessation of the growth of the Southern cotton mill industry. With the entrance of the United States into the great war many manufacturers began to realize the possibilities available for their mills to assist in the production of many kinds of products required both directly and indirectly for war purposes. Various classes and great quantities of cotton products are required for the prosecution of modern warfare. These products include explosives, uniforms and other clothing for the army, uniforms and other wearing apparel for the navy, tents for the army, leggings and many other articles. In accordance with the demand for these articles of manufacture, activity was renewed by cotton mill owners and the satisfactory progress of 1917 was partially the result of this movement. Many Southern mills are participating in Government contracts, both direct from Government orders and indirectly from other manufacturers who have Government orders, having large contracts for material required in the service, but details have reached the public in only a few instances.

Supplementing the figures above presented as to the results of the entire twelve months of last year, some data regarding the several quarter periods of 1917 are of interest. For instance, the best quarter of last year was the second in which is comprised the months of April, May and June. The total for these three months was 322,600 spindles and 10,500 looms, requiring an invest-

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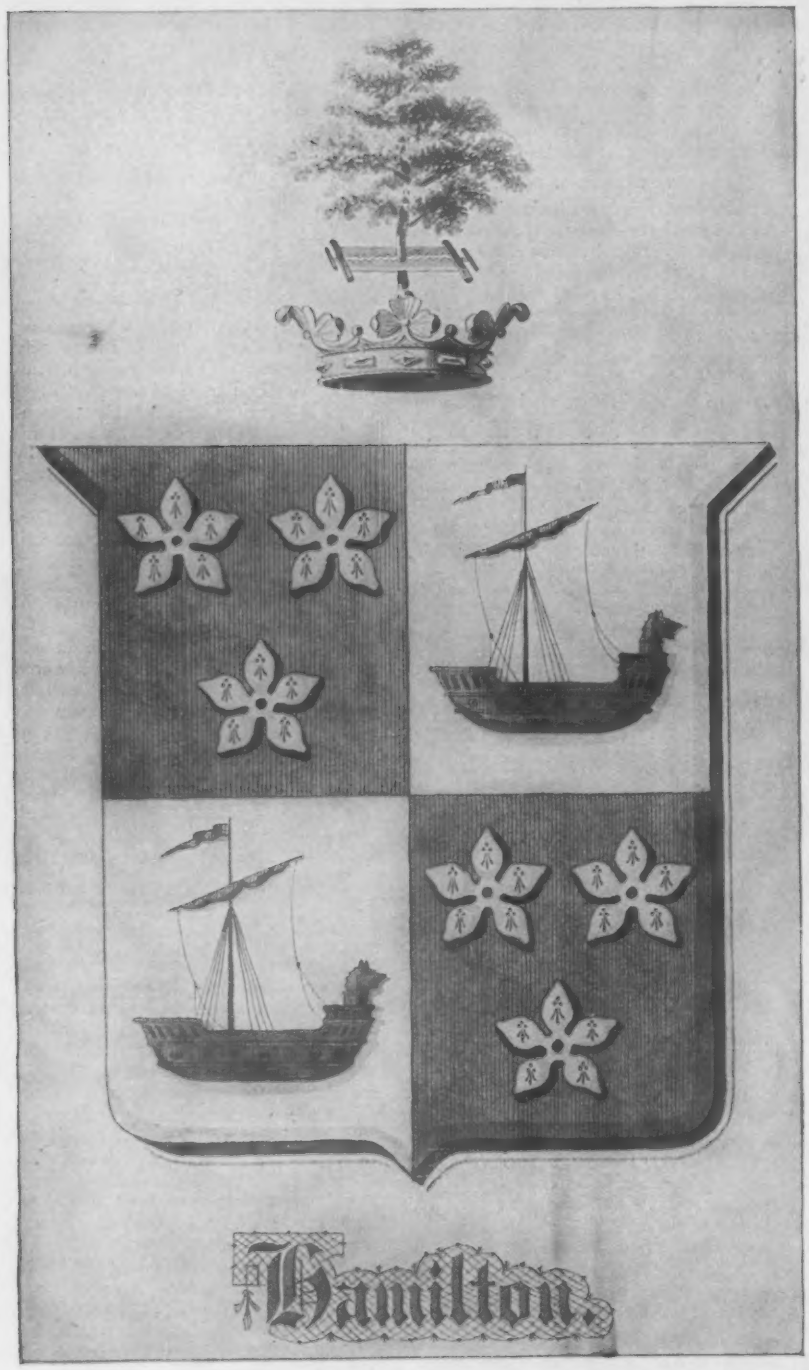

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ment of $8,000,000, for nine mills. Six of these were new mills installing 315,000 spindles and 9,200 looms at a cost of $7,880,000, while three were established mills adding 7,500 spindles and 1,300 looms at a cost of $197,500. All the figures quoted are approximate but may be accepted as representing the actual extent of the number of spindles and looms installed and the amount of capital invested.

SOUTH PRODUCING FINER CLOTH

Southern manufacturers of cotton cloth are steadily continuing their efforts toward the production of finer grades of woven products and are meeting with success in this branch of their activities. Most Southern mills were originally for spinning purposes and from year to year great increases have been effected in weaving plants, as indicated from time to time in reports and data gathered to show the installations of looms. The figures of 1917 were emphatic in this particular, 16,500 being the number of looms contracted for last year. They also emphasize the oft-repeated statement that it is the manufacturers who have been successful in the production of cotton products throughout the cotton growing region who invest the greater proportion of the new capital being put into cotton factories. This is mainly in the enlargement of established plants and partly in their investments with new organizations, to which they logically give the benefit of their experience.

SOUTHERN MILLS ADOPT ELECTRIC POWER

Every day more and more cotton mills of the South are installing electrical drive equipments, thus tending to maximum efficiency at a minimum cost in their power departments. It is seldom that a new mill available to electric power fails to adopt electricity for its driving energy, while established plants are continually making the change from steam power (in a few instances from direct waterpower) to the electric drive. There are many sources of electricity throughout the mill sections, but there are several large generating and distributing systems providing service for cotton manufacturers. The three principal companies furnishing electric power to the Southern cotton mills have hydro-electric plants. They are the Southern Power Co. of Charlotte, N. C., the Tennessee Power Co. of Nashville, Tenn., and the Chattanooga, Tennessee River Power Co. of Chattanooga, Tenn. The Alabama Power Co. of Birmingham, Ala., is also active in supplying electric power to Alabama's mills but its main service is to industrial plants of other character. The Charlotte enterprise is now transmitting about 150,000 electrical horsepower to some 225 cotton mills in North Carolina and South Carolina, the combined equipments of these mills totaling about 3,200,000 spindles and 125,000 looms. About 150,000 electrical horsepower is the combined output of the two Tennessee companies.

COTTON CONSUMED BY SOUTHERN MILLS

The consumption of the cotton crop by the Southern mills has been showing great increases from year to year and this feature is but another proof of progress. Thirteen years ago the Southern mills advanced to a demand for 2,000,000 bales of cotton for their annual use, thus exceeding the demands of other sections where the cotton manufacturing industry is active and this means mainly New England. The latter was then taking 1,967,000 bales annually. This proportion has increased each year as follows: Two million one hundred and ninety-three thousand bales for Southern and 1,896,000 bales for other American mills in 1908; 2,341,000 bales for Southern and 1,993,000 bales for other American mills in 1910; 2,363,000 bales for Southern and 1,993,000 bales for the demands of other sections in 1911; 2,744,000 bales for Southern and 2,631,000 bales for other American mills in 1912; 3,037,300 bales for Southern and 2,513,600 bales for other American mills in 1913.

The 1916-1917 cotton crop figures show that the total crop was nearly 13,000,000 bales and about 4,360,000 of these bales were consumed by the mills of the Southern states. This shows the steady increase since 1913. The mills of the other American sections (again principally New England) consume nearly 3,000,000 bales of the cotton product.

GENERAL SUMMARY OF SOUTHERN MILLS

There are now nearly 900 cotton mills in the South with a total of about 14,500,000 spindles, only 70,000 of these spindles being idle. Previous to the demand for cotton products which has come with war conditions there had been hundreds of thousands of spindles idle for several years because of trade conditions. There are about 300,000 looms in the South, all of which are active with the exception of about 1,500 in old plants and 4,400 now being placed in new mills. South Carolina leads the Southern cotton mill industry with 4,900,000 spindles and 115,500 looms. North Carolina follows with 4,737,000 spindles and 70,000 looms. Georgia is next with 2,410,000 spindles and 45,000 looms. Then comes Alabama with 1,172,000 spindles and 21,000 looms. Virginia has 526,600 spindles and 15,300 looms. Tennessee has 400,000 spindles and 5,300 looms. All the mills of the Southern cotton manufacturing industry represent an investment of probably $400,000,000.

IMPORTANT ANNOUNCEMENTS OF 1917

Among the many announcements of 1917 there were some of importance worthy of mention and a few of them may be briefly summarized:

Carolina Cotton & Woolen Mills Co., Spray, N. C., controlled by Marshall Field & Co., Chicago, decided to invest $3,000,000 for building additional mills. These plants will be located in Virginia and will have 300,000 spindles with accompanying looms. They will be located in virgin territory and will be accompanied by a complete industrial mill city with the latest modern improvements for health, comfort and convenience.

Norfolk Tire Fabrics Co., Norfolk, Va., organized to build $300,000 mills and install $740,000 machinery to manufacture tire fabrics for the automobile industry.

Steele's Mills, Rockingham, N. C., completed $300,000 investment which added 12,000 spindles and 300 looms to previous equipment.

Halifax Cotton Mills, South Boston, Va., increased capital by $400,000 in connection with plans for additional mills to manufacture automobile fabrics.

Roanoke Mills Co., Roanoke Rapids, N. C., awarded contracts for additional buildings, machinery, etc., to cost $636,000. This action will provide the plant with 23,000 spindles and 700 looms additional to present equipment.

Victor-Monaghan Mills, Greenville, S. C., installed 1,323 additional new looms in several plants.

Miller Bros., Dallas and Fort Worth, Tex., decided to build a $500,000 mill at Dallas, the daily capacity to be 300,000 yards of cloth. This cloth is to be mainly of that character which the firm consumes in manufacturing overalls. The machinery will include 50,000 spindles with accompanying looms.

Lanett Cotton Mills, West Point, Ga., added 1,000 looms and 15,000 spindles, installing this new equipment in a 410 by 260 foot building erected for the purpose.

There were many other interesting reports but the above show the general importance of some of the leading announcements which have been made during the year.

Lancashire Cotton Industry in 1917

A Lagging Trade for Six Months Succeeded by General Activity

By *Frederick W. Tattersall*

THE past year in the Lancashire cotton industry has been one of the most remarkable periods in the history of the trade, and conditions have prevailed which no living person could imagine as ever being possible. The striking feature has been the marked advance in prices. Yarn and cloth quotations have risen to a greater extent than the raw material. So far as profits are concerned spinners and manufacturers have made more money than for many years back, and at the moment the prices being obtained are very satisfactory. Difficulties in carrying on trade have been numerous, but producers have striven to adapt themselves to the new circumstances as a result of the war and certain developments have clearly shown that the ingenuity for which Lancashire employers and operatives have been known for over a century has by no means passed away.

THE CONTROL BOARD

Matters relating to raw cotton affairs reached such a crisis last June that the British Government intervened and appointed a Board of Control consisting of representatives of the Board of Trade, employers' associations and trade union officials, with powers to regulate transactions in raw cotton and production of yarn and cloth. The policy of the Board has been criticised from time to time, but as a whole its work has been of supreme importance and undoubtedly has saved the industry from disaster. It was decided that from the beginning of September owing to the shortage of supplies of American cotton, the output of the spinning mills should be reduced to 70 per cent. In both spinning and weaving employers had to pay levies on machinery run beyond 60 per cent., and the fund thus created has been used to compensate operatives who have been thrown out of employment. Recently the scheme has been revised, and for the present mills engaged on American cotton will not be allowed to run more than 60 per cent. and weaving concerns not more than 70 per cent., unless firms are engaged on Government contracts.

HEALTHY CLOTH DEMAND

During the first six months of the year the general demand in piece goods was of a rather indifferent character. Our customers could not see their way to pay the advancing prices, and offers from abroad lagged behind. Soon after the turn of the half year, however, a buying movement of considerable importance set in and since then an increasing trade has been done at very high prices. Shippers to India have bought freely of a variety of goods, a feature of the business being the activity in cloths suitable for printing and dyeing. The depression in gray shirtings has not been relieved, and numerous manufacturers have turned their looms on to other goods, with the result that the output of gray staples is now very limited. Another successful monsoon has been experienced in our Dependency, and it is understood the natives are very prosperous, as they have been enabled to secure high prices for agricultural produce. It has been a relatively poor year so far as China is concerned. Demand has been of a halting nature, and several events in the Far East have had a bad effect upon trade generally. Stocks in Shanghai have been allowed to run down very low, but there seems to be no disposition on the part of dealers to replenish supplies. One of the most active markets during the year has been Egypt, a very large trade being done from month to month. Owing to the submarine activity substantial quantities of goods have been lost on the sea, and recently much difficulty has been experienced in securing boats to take goods to that part of the world. Very satisfactory prices are now being obtained by merchants in Cairo and bigger imports are badly wanted. The South American markets have also been excellent, and several other minor outlets have provided an encouraging trade. Prices have been paid by our customers, which were thought quite impossible. Local merchants who have bought speculatively have made substantial profits as throughout the year values have steadily appreciated, and a lot of money has been made when goods have been bought one month and sold the next. A healthy demand has been experienced in home trade circles. Distributing houses have found it a difficult matter to meet adequately the requirements of retailers. Printers, dyers and bleachers have also been very busy, but, of course, in all departments of the industry the shortage of labor has been a serious handicap, and numerous contracts are now behind time. Makers of heavy materials have done very well with Government contracts, there being substantial buying from time to time not only for our own armies, but also for the forces of France and Italy. Some big contracts have recently been placed in strong cloths for aeroplane use.

YARN TRADE VERY PROFITABLE

The year opened with spinners of yarn in a fairly healthy position, but during the first few months ground was lost, and toward the end of the half year the margin of profit tended to restriction. The buying movement in cloth, however, which occurred a little later, had its due effect upon yarn, and spinners began to improve their position. From September and henceforward a very big trade has been done, and in spite of dearer raw cotton, prices in twist and weft have advanced to a greater extent. The remunerative state of trade has not yet had time to show itself in the stock-taking results of spinning companies, but it is expected that the reports to be published at the end of December will show very big gains. It may be said that according to an analysis of the figures issued for the eleven months ending Nov. 30, the profit on share capital works out at about 13½ per cent., as compared with 11 per cent. in the same period of 1916. In American yarns a feature of interest has been the active demand for ring beams, and at the time of writing early delivery, especially in medium numbers, is practically unobtainable. A big trade has also been done in coarse counts for Government cloths. Producers of fine numbers have had nothing to complain about.

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The Egyptian yarn market has also experienced a very busy year, and certain producers of specialties have made remarkable profits. It should be said that the improvement in trade generally has been largely due to the lessened output of the mills which has enabled producers to secure very good prices for the amount produced. Spinners of export yarns have been harassed by numerous difficulties. For several months shipments to Holland and Scandinavian countries have been stopped by the Government. Buying for India has been erratic, and it is quite evident many exporters have badly missed the market. A substantial business has been done for France.

WAGE QUESTIONS

At the beginning of the year the operatives in all branches of the industry were receiving 10 per cent. higher wages than when the war broke out in August, 1914. In February there was an application for a rise from spinners and card room hands, and as a result of arbitration proceedings a further rise of 10 per cent. was secured. A little later the work people in the weaving section demanded an advance, and they obtained 10 per cent. A few weeks ago the operatives in all branches of the trade put in applications for increases varying from 25 to 40 per cent. A rather serious state of affairs was reached, but at a conference of all concerned it was agreed that wages should be advanced 15 per cent., the payments to unemployed work people under the Curtailment of Production Scheme remaining as in the past. It will, therefore, be seen that compared with pre-war days the operatives are now receiving higher wages to the extent of 35 per cent.

PROSPECTS UNCERTAIN

With the conditions so abnormal the prospects for our industry can only be described as uncertain. It is satisfactory to be able to state, however, that spinners and manufacturers have engagements ahead varying from four to six months at prices which show substantial profits. During the last few weeks the Manchester market has been quieter, the falling off in business being largely due to the very high prices, and the long time required by producers for delivery of fresh contracts. Owing to the war, production in Germany, Austria, France and Italy, has been brought to a standstill.

SHIPMENTS OF YARN FOR THE ELEVEN MONTHS ENDING NOV. 30.

	Lbs.
1915	173,343,300
1916	160,967,600
1917	125,133,800

SHIPMENTS OF CLOTH FOR THE ELEVEN MONTHS ENDING NOV. 30.

	Yards.
1915	4,374,695,300
1916	4,756,143,400
1917	4,626,165,400

General Prosperity in Cotton Market

Handicaps of Transportation, Labor, Etc., Did Not Prevent Unparalleled Demand

NOTWITHSTANDING all the difficulties of transportation and all the extraordinary problems arising from the continuance of the war and the entrance of this country into the world conflict, the year 1917 has been one of unexampled prosperity for both cotton producers and manufacturers in this country. Makers of cotton goods have found an unparalleled demand for their product at prices which have permitted them to meet the ever-increasing cost of raw material and labor. Southern growers, having seen the surplus production of 1914 gradually absorbed, have confidently adhered to a policy of slow marketing, and in consequence have realized prices higher than previously secured since 1869. This, of course, has reflected the effect on supplies of the third short crop in succession, and the tremendous demand arising from the equipment of American armies. And the New Year starts with prices at practically the high point for both raw cotton and its products, with the world's visible supply 1,300,000 bales less than it was at the beginning of 1917, and with the trade evidently apprehensive that no large yields of cotton are probable in the South until after the war is ended.

While fluctuations in the futures markets have been extraordinarily violent, declines have been of comparatively brief duration and have resulted in technical conditions which have merely stimulated the upward trend of prices. As a matter of fact, there have been only two declines of consequence during the entire year. The first was precipitated by the announcement of the German Government that an unrestricted submarine campaign would be undertaken early in February. This was taken as foreshadowing the break which almost immediately followed in the relations between this country and the Central Powers, and was followed by one of the most rapid and sensational overnight declines in the history of the market. At the close of business on Jan. 31, May contracts in the New York market were selling at 17.66. Within fifteen or twenty minutes after the re-opening of the market on Feb. 1, following the overnight publication of the German announcement, May sold at 12.50. This was obviously the result of speculative liquidation. The weakness found little reflection in Southern spot markets, and after the selling of foreign-owned cotton had been completed, the market developed renewed firmness owing to the unyielding attitude of Southern holders and growing nervousness over the coming crop. Agitation in the South for increased food crops combined with the sensational advance in grains of all sorts, the increased difficulty of raising cotton in boll weevil sections, and the wisdom of a change of crops owing to the scarcity of effective fertilizer, created a feeling that the acreage under cotton was likely to be reduced. That this sentiment was not unfounded developed later when the Government's estimate was published in July showing an acreage reduction of about 4 per cent, and there were nothing more than brief reactions on the advance which followed the February break until prices reached the 27½ cent level during the middle of the summer. An improvement in crop prospects during August and the approach of new crop competition then encouraged a more bearish view of prices. From a crop prospect of 11,633,000 bales on June 25, the official figures indicated an increase to 12,499,000 on Aug. 25, these figures being exclusive of linters. Prices eased off to about the 20-cent level during September, and the trade at that time seemed confident that with the outlook for a crop of perhaps 13½ million bales including linters, there would be no general holding in the South above the 20-cent level. The crop prospect dwindled during September, however, and the frosts of early October prepared the trade for a small Government estimate, revived confidence in the determination of Southern holders, and led to a renewal of the upward movement in prices which has since extended to well above 31 cents for the early new year deliveries.

The acreage planted to cotton in 1914, before the beginning of the war, amounted to 37,406,000 acres, according to the revised estimate. The effect of the low prices which prevailed immediately after the war started was shown in the attitude of planters during the Spring of 1915, the acreage put under cotton amounting to only 32,107,000 acres. The higher prices secured for that crop promoted increased planting in the spring of 1916, the acreage being placed at 36,052,000. The reduction reflected in the preliminary estimate of 34,600,000 bales for 1917, was not the result of any decline in prices. On the contrary the market had shown a steady advance, but was rather attributable to natural obstacles and the widespread campaign for crop diversification. In the more recently infested boll weevil sections, apprehensions of severe losses from that pest undoubtedly influenced the acreage of 1917. The scarcity of potash which is considered peculiarly adapted for the fertilization of cotton in the older states, may also have been a factor. But the main influence was doubtless the need for increased food crops, and the extremely high prices which the South was forced to pay for grain and other foodstuffs. In some sections large profits were seen in the production of peanuts, and the acreage devoted to them was materially increased. There were also increases in the acreage put under grain and forage crops, which contributed to the final result. Whether these conditions will operate with as much force during the coming spring is a question which the trade is now considering, but with reference to which market opinion has not yet crystalized. Maximum prices have been fixed on wheat, while Government control has not yet extended to cotton, and the present price of cotton would certainly seem an adequate incentive for the farmer's best efforts in planting and cultivation.

On the other hand, there are certain preliminary drawbacks just as there were last season, perhaps they are even more clearly outlined. In the first place, the year 1917 has been one of the driest on record in the Southwest. The drouth there has been so severe that the Government has been forced to move livestock from West Texas to sections where more water was available. The soil is reported dry and hard, and it has long been considered almost impossible to raise a large crop in the Southwest without a good season in the ground. Generous rainfall between now and the end of February would improve the outlook, but for the best results in South Texas, ground should be prepared before the end of January and an early start made with planting. Anything which tends to delay planting renders it less likely that the plant will secure vigorous growth before the intense heat of the summer, and also increases the danger of loss from insects. It seems, too, that the Southwest has another insect pest to deal with. The pink boll worm has invaded some of the extreme Southern counties, and the Government is co-operating with planters and other local organizations to confine and eradicate it. The early frost will probably minimize the insect infestation in Eastern and Central sections of the belt, but labor is scarce and high; the same may be said of fertilizer, and it is reported that farmers who have tried diversification have secured satisfactory results, so that the acreage in boll weevil sections may not show as much increase as might be expected in view of attractive prices.

According to the experts of the Department of Agriculture, the early frost of last autumn curtailed the crop by at least a million bales and lowered the grade of much more. The short yield of the present season, consequently, may be considered due, in considerable measure, to climatic conditions, as well as to a state of affairs created by the war. The final estimate of the present crop published in December was 10,949,000 bales excluding linters. Had it not been for the frost, therefore, the estimate would probably have been in the neighborhood of 12,000,000 bales, suggesting a total crop of approximately 13,000,000 bales including linters. Had the present crop turned out such a total, the present predictions of a steadily diminishing yield during the continuance of the war would probably have been less general or less confident. With a favorable planting and growing season a better yield per acre would at least seem possible, and should the war continue, the question of prices is expected to depend most largely upon prospects for the coming supply as they develop.

PROBLEM OF TRANSPORTATION

As anticipated at the beginning of the year, difficulties of transportation have entered more and more largely into market problems. For the three trade years preceding the outbreak of the war, exports of cotton from this country averaged in the neighborhood of 9,465,000 bales per season. In the season of 1914-15 they aggregated 8,544,000; in 1915-16 they amounted to 6,911,000; and for the season ended with Aug. 1, 1917, only 5,739,000 bales. For the first four months of this season, they have amounted to 1,863,157 bales including linters and from Aug. 1 up to the first of January ran about a million bales behind last year's record. The difficulty of securing raw supplies has led to an extension of British Government control over the Lancashire cotton mills. There are restrictions on the manufacture of cotton goods, and the Government allots tonnage for each month of just sufficient carrying capacity to supply this restricted consumption. The allotment for both December and January amounted to 40,000 tons which is equivalent to about 45,000 bales weekly for the Lancashire spinners. Meanwhile, the consumption of this country has steadily increased. During the season ending with July, 1914, or just before the beginning of the war, domestic mills consumed 5,884,733 bales, including linters. For the year ending August, 1915, the consumption was 6,009,563; 1916, 6,191,110, and for 1917, 7,668,497 bales. For the first four months of this season the consumption of lint and linters has been in the neighborhood of 2,700,000 bales. Active cotton spindles have increased from 32,744,000 to 33,600,000, while the increased consumption has also reflected the increased demand for heavy-weight goods and the shifting of machinery from other textiles to meet this demand for Government supplies.

THE WORLD'S CONSUMPTION

Under prevailing conditions reliable information as to the world's consumption is difficult to obtain. According to Secretary Hester of the New Orleans Cotton Exchange, the annual world's consumption of American cotton for the three years ended Aug. 1, 1914, averaged about 14,500,000 bales. During the three seasons since then, the average has been in the neighborhood of 14,231,000 bales, but this has included the assumed consumption of all pre-war supplies carried forward in the Central Empires. Consumption abroad during the coming season will doubtless depend upon transportation facilities. Any increase in the allowance made by the French Government for cotton manufacture would seem improbable, but the British Government will doubtless exert

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every available effort to conserve Lancashire trade, and if tonnage can be obtained for that purpose, will doubtless remove present restrictions on manufacture. In many quarters a more optimistic view of future shipping conditions prevails, owing to the increased production of new tonnage, and a belief that the activities of submarines are being gradually curtailed. On the other hand, the military plans of the United States must contemplate the use of a very large amount of shipping, and at last accounts, cotton shippers were bidding a rate of $11.00 per hundred for small amounts of ocean freight room from New York to Liverpool.

One effect of congestion arising from the ocean freight situation has been seen in the difficulty experienced by cotton shippers in securing warehouse space in New York, and consequently in the ruling of near months here, which have commanded very high premiums over later deliveries during the entire season. Southern shippers have found it very desirable to carry a little cotton here, for the reason that occasionally small amounts of freight room are offered when practically none is available at the Southern ports. This cotton has figured in the running stock at New York, but the amount free for delivery on contract has been limited. The situation in this respect, and the delays to which shipments in the South are subject, has led to renewed agitation for the Southern warehouse system. This plan, it may be recalled, has been discussed off and on for a number of years, but practically dropped from sight with the passage of the Cotton Futures Bill. The scheme is to license various warehouses in the South and to permit the tender of warehouse receipts issued against cotton in these warehouses, in settlement of New York contracts. Under normal conditions there has always been strong opposition to any such plan but it is realized that the present state of affairs renders it difficult to maintain a sufficient stock of cotton here to protect short hedges. The Liverpool market is working under even greater disadvantages of a similar sort, the result being that English importers have hedged their Southern purchases, in American markets, and replaced them in Liverpool only when their cotton was actually on shipboard or in the Liverpool warehouses. Sellers of hedges for the same reasons, have shown a preference for New Orleans, while hedge buying has shown a tendency to concentrate in the New York market. In fact, there has seldom if ever been a year during which trade buying has been more in evidence around the local ring. With Southern holders showing remarkable firmness, and with contracts selling at discounts, spinners have been very heavy buyers against their forward requirements as represented in Government or other orders for goods. As they secure actual cotton, these hedges will undoubtedly be liquidated, and probably represent a source of considerable pressure during the spring and summer.

DEMAND FOR MILL PRODUCTS

Little doubt appears to be felt in local trade circles as to the continued activity of domestic mills. It is realized that this country has not yet felt seriously the hardships of war, and that greater economies must be practiced. But the needs of cotton for the equipment of growing armies and for the manufacture of munitions is expected to fully maintain if not to cause a further expansion in domestic consumption. The demands for these purposes run into cotton much faster than the ordinary every-day requirement of light or fine goods, and while the beginning of the year finds some uneasiness over the fuel situation, there is no serious or general difference of opinion as to the likelihood of continued heavy domestic mill takings. The features which are most generally discussed with reference to the future of values are the duration of the war and that other great uncertainty—new crop prospects. There are some who feel that peace in the near future would cause more or less disorganization. They argue that large Government contracts for cotton products would probably be cancelled, leading to the liquidation of mill hedges and a return to much lower prices. On the whole, however, peace would be considered bullish on cotton, owing to the urgent necessity for replenishing supplies abroad. The chances are, at least, that the South would take that view of the situation, and that any tangible hope for the end of the war, would serve to strengthen rather than weaken their determination to secure high prices. The value of the crop grown in 1916-17, excluding seed, has been estimated at $1,146,102,225, and the prosperity of the South has introduced an element into the market of which very little account was taken before the war. In previous years, the bulk of the crop was marketed during the autumn. Under present conditions, with improved banking and warehouse facilities the South has fully demonstrated its ability to market slowly, and from the very beginning of this season has followed an almost unbroken policy of selling only on advances. The highest prices mentioned in connection with early season holding movements have been fully realized, and each further advance brings out increased offerings, but the feature of the season has been the stability of Southern holders, and the ability of spinners to follow advances.

THE YEAR IN FIGURES

	1917	1916	1915
January:			
May contracts, New York	19.08-16.55	12.88-11.93	9.10-8.00
In sight for month	1,253,624	1,105,687	2,298,922
Ginned to Jan. 1	11,039,491	10,636,778	14,443,146
Ginned to Jan. 16	11,137,686	11,751,990	14,915,850
February:			
May contracts, New York	16.78-12.50	12.28-11.24	9.98-8.26
In sight for month	680,492	882,481	1,867,631
March:			
May contracts, New York	19.11-16.48	12.08-11.34	9.88-8.32
In sight for month	499,738	818,707	1,441,742
Final ginning	11,363,915	11,068,173	15,905,840
Linters	1,330,714	944,640	832,401
April:			
May contracts, New York	21.25-18.72	11.99-11.76	10.38-9.46
In sight for month	357,570	697,231	1,008,386
May:			
May contracts, New York	21.34-19.35	13.15-11.98	9.88-9.00
In sight for month	357,497	648,588	575,056
June:			
July contracts, New York	27.58-21.59	13.38-12.50	9.62-9.15
In sight for month	360,216	419,011	291,109
June condition	69.5	77.5	80.0
July:			
July contracts, New York	27.20-23.61	13.17-12.70	9.39-8.41
In sight for month	386,393	389,867	276,843
July condition	70.3	81.1	80.3
Acreage estimate	34,600,000	36,052,000	32,107,000
August:			
October contracts, New York	26.50-21.40	16.33-13.10	10.02-9.10
In sight for month	385,299	423,627	232,783
August condition	70.3	72.2	75.3
Commercial coup	12,941,000	12,861,538	15,136,285
Visible end season, America	1,504,000	2,235,634	3,099,881
September:			
October contracts, New York	24.49-19.95	16.50-14.81	12.22-9.71
In sight for month	7,094,377	1,680,340	1,268,908
September condition	67.8	72.5	69.2
Ginned to Sept. 1	615,597	850,812	463,896
Ginned to Sept. 26	2,512,800	4,081,693	2,904,063
October:			
December contracts, New York	27.45-23.60	19.75-16.87	13.00-11.70
In sight for month	2,036,480	2,600,585	2,016,565
October condition	60.4	56.3	60.8
Ginned to Oct. 18	5,577,156	7,305,966	5,710,824
November:			
December contracts, New York	30.50-27.05	21.06-18.64	12.37-11.28
In sight for month	2,023,363	2,290,686	1,972,700
Ginned to Nov. 1	7,182,674	8,626,289	7,382,578
Ginned to Nov. 14	8,574,316	9,619,056	.....
December:			
December contracts, New York	30.73-28.75	20.42-16.13	12.61-11.64
In sight for month	1,809,353	1,879,944	1,889,000
Ginned to Dec. 1	9,716,098	10,356,013	9,705,817
Government crop estimate	10,949,000	11,511,000	11,161,000
Ginned to Dec. 13	10,142,850	10,845,989	10,303,253

How to Win the War (Vanderlip)

(*Continued from page* 103)

25-cent thrift stamps. They are affixed to a thrift card, which holds sixteen. The sixteen will cost $4.00, and their only purpose is to be exchanged for a War Savings Stamp, by the payment of 12 cents or 13 cents, or whatever the price may be in the month that the exchange is made.

There is the whole story. It is simple. It can be explained in two minutes. Any child can understand it. And what is it going to accomplish? It is going to raise two billion dollars. That is a big thing; the biggest financial transaction every undertaken in this country, excepting the two Liberty Loans.

A LESSON IN THRIFT

But that is not the great thing about it. It is going to teach thrift to America. That is a great thing. We needed the lesson. We needed it desperately. We have not stood up very well under that hardest test of all—prosperity. We have become careless; we have become a spendthrift people. Our savings do not compare per capita with those of much poorer countries. Sweden has five times as much saving per capita as we have in this country. So has Switzerland. We have fifteen million depositors in savings banks. I believe we shall see thirty million holders of these certificates. That will be something. It will be thirty million stockholders in the United States. It will be thirty million better votes; better citizens.

But, great as it is, that is not the big thing. The thing we have got to do now is to win the war. And this is going to help us in the most direct way to win the war. If we do not accept the lesson—if we do not accept the personal responsibility—we are going to lose the war. This war is not won. It is going to be a good many months before it is won by a military decision. It is going to mean a vast amount of preparation. We have got to drill an army of soldiers, but we have got to drill a larger army; an army of many, many millions; drill them to economy, drill them to self-sacrifice, drill them to self-discipline, and, until they are drilled—until we have that unity of purpose which it will mean if we have thirty million stockholders in the United States—the full force of the United States is not going to be felt in this mighty struggle.

So there is the lesson for every one of us to take home to ourselves: not to pass on to somebody else. Do that, yes; but let us practise as well as preach. It is going to be a job of practising day after day. You cannot be good for one hour of the day and do what you please the other twenty-three, and take much credit to yourself. You cannot buy a thrift stamp and think that you are doing your duty. In the measure that you have capacity to spend, in that measure you have got to learn to have the ability to save; not for just the good old-fashioned reasons of economy, but for the reason that I have been trying to make plain: the fact that you are interfering with the Government when you go on with pleasure and entertainment as usual.

RELATION OF WAR TO BUSINESS

But we are all doing just that thing. We don't think. We don't recognize that we are competing with the Government; that we are tampering with the equipment of the army; that we are slowing down the work of the Government getting this army prepared. We send our sons and our brothers to the front. Don't we want them equipped? Don't we want to make their sacrifice as effective as possible? Don't we want as many of them to return as possible? Don't we want to give them all the protection that complete equipment in armament can give? Well, then, we must not tamper with the equipment of the army. We must see that that means each of us. It means what we are spending needlessly day after day, and it means that we must refrain from some of that spending.

Well, what is this going to mean? Is it going to stop business? Are we going to stop trade? Are we going to break up business? A business man has got to live, you say. But has he? A lot of men are going into this thing who are not going to live, and I have said before, I would rather have a receiver than an executor.

RESPONSIBILITY OF SITUATION

But the thing is not so serious as that to business, for this reason: We cannot make this lesson one hundred per cent. efficient. Loud as we may raise our voices, earnestly as the appeal may be made, we are not going to be one hundred per cent. efficient with one hundred million people. Never was there such full employment. Never were wages so high. Never was there a time when the weekly payroll reached such a gigantic fund. Do you think all the people that have suddenly got so much more money than usual are going to be economical? Why, they will spend on luxuries more than they ever spent, in spite of all we can do to bring this lesson home, and in doing it they will tamper with the equipment of the army. In doing it they will slow down our work, put off the date that we are to be effective and lessen the number of men who will come home alive. That is the responsibility.

ECONOMY NECESSARY

So, business men do not need to be afraid of a campaign of economy. Bankers do not need to be afraid of it. Savings banks do not need to be afraid of it. What about the savings banks? This is a better thing than the savings banks can offer. Is it going to break the savings banks? Not at all. I think it will somewhat decrease their new deposits, and while it is doing it, it will be teaching thrift to the community, and the savings banks will be the greatest gainers of all in the end. This lesson of thrift will do more to repair the money ravages of war than anything else that can be accomplished. It is going to be a world hungry for capital, and these millions of new springs of capital—

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springs that in the aggregate can flow a gigantic stream of capital—will do more to put us in the forefront financially in this new world that is ahead of us than anything else you can imagine. Don't you see the importance of this campaign from so many sides? It makes the mere raising of two billion dollars look insignificant beside some of the greater results that flow from this plan.

I have been preaching—and I suppose it is preaching—for you to be careful about your expenditures; not to spend your money on non-essentials. I want to say a word to you about not spending yourselves too much on non-essentials. Never was there a time when there were so many national problems; immediate problems and problems of the future. I tell you, we drew a red ink line underneath our social order, pretty nearly, when this war was declared.

The future is going to be very different from the past. Precedent will no longer be a guide. We are going to do things in new ways. We have seen the Government occupy a new relation toward business; toward our affairs. We are going to see state socialism developed as we never dreamed it would be.

Perhaps of all the mischievous things you could do with your abilities, the worst is to criticize the Government today without knowing your facts. Most of the criticism is misinformed. You find people with grouches against the Government, criticizing what is being done, fretful about what is not being accomplished, without measuring the size of the job; without knowing anything of the devotion of the men who are giving their lives to it; without understanding any of the facts. Now, there is enough to criticize. There is not one of you that could expand his business twenty times in a year and not have something to criticize. There would be a lot to criticize. There is a lot here to criticize. This war needs a general manager. It needs somebody who will put proper perspective on what we are doing. As we are going now, we are putting as much emphasis on things that are not immediately needed as we are on things that are immediately needed.

Everyone charged with a responsibility for getting anything ready is doing his level best to do it. Congress has made the appropriations, and things that will not be needed for a good while are getting in the way of things that are needed at once. Probably contracts have been too much bunched in the East. The thought was that it would save transportation, but transportation has broken down. Too much of a burden has been put upon it in certain localities. We need to have a Government bureau which will distribute labor. It is not enough that you forego buying things and throw people out of employment, unless those people become connected with the things which the Government has to do. Now, those things are recognized, and steps are being taken to improve them. You can help by thinking about these problems and pushing ideas along and impressing your opinions upon Washington.

And so you have larger duties of citizenship than you have ever had. You have this personal responsibility to understand what this war means in things—in things to be produced; in the products of the workshop—and so to govern yourselves that you do not get in the way of the Government; so to control your expenditures that you leave the Government free right of way.

It is a trite thing to say that we are not awake. We are awake. We know there is a war, but the thing is so big we do not comprehend it. We are asleep so far as recognizing the full significance of these figures is concerned—of understanding how gigantic the task is.

In a French trench a shell exploded. Every man in that trench went down, save one—the young officer in charge. That man stepped up onto the firing bench and looked out and saw coming toward him a charge of German soldiers. That man loved France in his very soul. He could not bear to see another foot of France taken away. He turned to those men lying in the trench and he shouted: "Dead men, get up!" And, stunned and wounded as they were, enough of them got up so that they manned the guns, drove back the enemy, and held the trench for France. And I feel that Liberty is going to say to all of us: "Get up, dead men! Wake up! So feel in your souls what your duty is that you can do the superhuman thing. Get up and fight this war."

Future of Export Trade (Austin)

(*Continued from page* 108)

and tractors, leather manufactures, railway material, chemicals, electrical supplies, automobiles, paper and its manufactures, wool and its manufactures, and copper and its manufactures.

COTTONS, IRON AND STEEL FOR EXPORT

The most important of these great groups forming international trade are cotton goods and iron and steel. The value of the cotton goods entering international trade is normally about $1,250,000,000 per annum, and of iron and steel manufactures, including agricultural implements and automobiles, about $2,250,000,000 per annum. These two groups, the manufactures of cotton and the manufactures of iron and steel, aggregate nearly one-half of the value of all manufactures entering international trade, for the total value of all manufactures exported from the manufacturing countries of the world is but about $7,000,000,000 per annum, of which we supply about one billion, or about one-seventh of the whole.

And it happens that in these two great groups, forming one-half of the world trade in manufactures, cottons and iron and steel manufactures, we are better equipped than any other countries of the world. We produce two-thirds of the cotton of the world and 40 per cent of the world's iron and steel, and what is equally important, we have better machinery and more skillful workmen than any other country. Capital is becoming a more and more important factor in manufacturing with each year, and we now lead the world in a surplus of available capital for manufacturing. We have paid off most of our debts abroad during the war, and have transformed ourselves from a debtor to a creditor nation. Our wealth is not only more than that of any other country, but is actually more than that of Great Britain, Germany and France put together, and these three are the principal manufacturing countries of the world outside of the United States.

CAPITAL FOR MANUFACTURING

Success in supplying the world with manufactures depends upon large sums of capital and experience in its use. That is shown not only by the successes of other countries, but by the few successes that we have had in our own export trade. What lines of our manufactures have made the greatest successes in our own list of exports? Iron and steel, automobiles, agricultural implements, petroleum, lumber and its products, leather and its products, and copper and its products.

Curiously, the cotton goods industry has lagged behind the others, both in the increase of capital and the growth of exportations. The capital employed in cotton manufacturing in 1879 was $220,000,000, and in 1914 $889,000,000, or practically four times as much, and the exports of cotton goods in the meantime have grown from $11,000,000 in 1879 to $51,000,000 in 1914, or four and one-half times as much. The growth of capital in the cotton industry was less rapid than that of most of the others. The increase in investments in the cotton industry was about 300 per cent in the period of 1879 to 1914, agricultural implements 400 per cent, leather and its manufactures 400 per cent, wood and manufactures 400 per cent, and iron and steel 700 per cent. In the same period the export of cotton manufactures increased 350 per cent, manufactures of wood 550 per cent, manufactures of leather 700 per cent, agricultural implements 950 per cent, and iron and steel manufactures 1700 per cent. Manufactures as a whole showed in 1914 an increase of 725 per cent in exports over those of 1879, while as above shown cotton manufactures showed only an increase of 350 per cent in that same period.

COTTON MANUFACTURERS LAG

It is thus apparent that the manufacturing industry in which we have the greatest monopoly in the production of raw materials, cotton, has made a smaller percentage of gain in both capital and exportation than most of the other great industries professing to seek the export field. It is true that the cotton goods exports have nearly trebled in value in the three years of the war, and while a part of this, as in other articles, is due to higher prices, the actual increase in quantity is sufficient to show the capacity of manufacturers to expand their production and exportation if circumstances are of a sort that they consider favorable. The value of cotton manufactures exported in 1917 was $136,000,000, against $51,000,000 in 1914, and the number of yards of cotton cloth exported 690,000,000, against 414,000,000 in 1914.

Why should not the cotton manufacturers of the United States "do their bit" in the task of permanently enlarging the export trade in manufactures after the war, and so help to sustain our rank as an exporting nation, and at the same time make increased profits for themselves? The value of the cotton goods entering the international trade of the world in 1913, the year before the war, was in round terms $1,250,000,000, and of this Great Britain, which bought her raw cotton from us, exported $640,000,000 worth, Germany $100,000,000, France $77,000,000, Switzerland $55,000,000, Japan $52,000,000, India, Netherlands and Italy about $40,000,000 each, and yet the United States, which grew two-thirds of the world's cotton and prides herself upon having the best machinery and the most skillful workmen, exported in that year but $53,000,000 worth of cotton manufactures, or about 4 per cent of the cotton goods entering the international markets of the world.

COTTON MANUFACTURERS CAN COMPETE

Nor can it be said that this is due to an inability to compete with the other manufacturing countries, even though they do utilize cheaper labor than our own. Three separate investigations of the relative cost of producing cotton cloths in Europe and in the United States have shown in each case that the American manufacturer can and actually does produce and sell the lower grades of cotton cloth, the class most demanded by the world markets, at lower prices than the manufacturers of Europe. These investigations were made by the Department of Labor in the closing decade of last century, Harvard University in 1911, and the United States Tariff Board in 1912, and they showed in each case that American manufacturers were actually making and selling cotton goods at a lower rate than European manufacturers were making and selling goods of the same grades.

The success of the European manufacturers lies apparently in their closer study of the export field. Their goods are marketed by people devoting their entire time and capital to the business of making or obtaining goods to suit the local markets the world over and selling them upon terms required by those markets, and by this process they have built up the enormous markets in goods made from the raw cotton which they buy from us, while we have been content to furnish the raw material to them and ourselves sell but 4 per cent of the finished goods entering the international markets of the world.

OPPORTUNITY OF WEBB BILL

But a special opportunity is now offered to our own manufacturers to regain their proper share of the foreign markets for cottons which they have permitted their rivals to monopolize. The "Webb Bill," so called, which permits our manufacturers to form combinations to improve their foreign trade, has now passed both branches of Congress and will doubtless become a law within a few days or weeks at the most. Under it our manufacturers can form exporting organizations which will have the opportunity permanently and persistently to exploit the foreign fields and utilize the sums of capital and experience necessary to manufacture the goods in the form required by other parts of the world, and sell them upon the terms which those fields demand. The additional capital which our manufacturers will require for production of goods in form to suit the foreign markets and to sell them upon the terms required can be readily obtained at this time when the wealth and available capital of the country is far beyond that of the past and beyond that of any other country.

BETTER CONDITIONED THAN OTHER COUNTRIES

Not only will the shelves in other parts of the world be empty at the close of the war, but we shall be in far better position to fill them than any other of the great manufacturing countries. All of the manufacturers of cotton goods and of manufactures in general, with the single exception of Japan, have been actively engaged in the war, and their factories have been transformed from those of the production of general merchandise to that of war materials, and it will take months after the close of the war, perhaps a year or more, to bring them back to former conditions, and even more than a year to bring them to normal conditions of supply of raw material, effective machinery (for much of their present machinery will be worn out at the close of the war) and capital for financing the old and new establishments, and the distribution of their products abroad.

We may, therefore, feel assured that the American manufacturer has before him the golden opportunity of his relation with the foreign markets of the world. We have given the world during the war a better acquaintance with our product than ever before, the shelves will be empty, and those who have been accustomed to fill them will require months, and perhaps a year or two, before they will be in position to return to their normal activities.

STUART W. CRAMER, *Pres. & Treas.*
PAUL WOODMAN, *1st Vice Pres.*

CLEVELAND D. WELCH, *2nd Vice Pres.*
H. LAN MOORE, *Secy. & Asst. Treas.*

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Cotton Technical Section

Manufacture of Cotton Cloths for Military Uses

Constructions of Goods Used in Enormous Quantities for Clothing, Shelter and Hospital Purposes

By *John Reynolds*

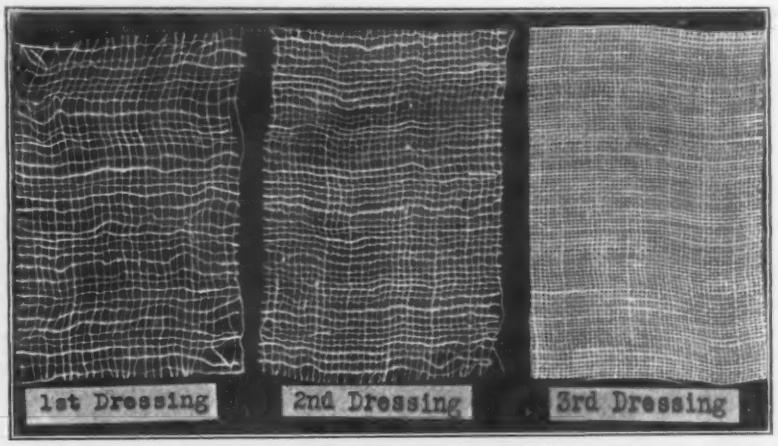
COTTON cloths used for military purposes embrace a very large variety of weights and constructions. The specifications furnished by the Government give particulars as to sley and pick, width and weight, and in some cases the yarn to be used, also the color or shade, the test for permanency of color or shade, and the breaking strength of the cloth. Manufacturers are allowed considerable latitude in the present crisis, however. A sealed standard sample is usually submitted.

A Government contract might appear very formidable alongside the ordinary cloth contract, but it is only a clear statement of what is wanted. Nothing unreasonable is asked or expected. A corps of Government textile inspectors are employed composed in the main of practical men who usually have completed a course in some recognized textile school. They must have an understanding of yarns and cloth and are required to pass a civil service examination, the highest marks being given for character and experience. The salaries range from $1,200 to $2.000 per year, traveling expenses being paid by the Government and a certain allowance made for hotel rates.

The duty of these inspectors is to keep in touch with the mills that are working on Government contracts. The usual method is to assign an inspector to a city, town or village where a mill or mills are weaving Government cloths. These men inspect the cloth daily to see that no imperfect goods are shipped, and that the construction, color or shade, and the breaking strength are kept up to the standard demanded by the Government. They also see that deliveries are made on time and make a daily report of yards and quality delivered and ready to be shipped. The officials of the mills are requested to show the inspectors every courtesy and to give all the information possible as to yarns and stock used.

The Government requests nothing unreasonable, is a good customer, and pays bills promptly; but must have quality, and what is equally important, deliveries must be on time; ahead of time if possible, because the uniform, tent, stretcher and cover makers are working night and day to make the necessary equipment for our new army. Hence the reason why a large corps of inspectors are employed to hasten the production and see that the standard of quality is maintained.

The lightest fabric made for military use is the bandage cloth. This ranges in construction from 20 warp threads and 12 picks with 30s yarn in both warp and filling, to the heaviest kind of bandage cloth, known as the bender bandage. The latter is made from regular and reverse two-ply warp yarns and single filling. Other cloths are the standard Government sheeting; the standard print cloth, which is rubberized and made into soldiers' capes; uniform cloth both light and heavy; corset jeans for use where a good strong unbleached cloth is wanted, bobbinette and marquesette, and a large variety of ducks and trench tool cloth, besides numerous narrow webbings.



BANDAGE CLOTH, ABSORBENT GAUZE

Bandage cloth comes in a variety of constructions for first, second and third dressings. Three constructions are being made as follows (all 36 inches wide):

1st Dressing { 20 x 16 / 22 x 18 / 24 x 20
28s warp; 28s filling.

2nd Dressing { 28 x 24 / 32 x 26 / 32 x 28
30s warp; 30s filling.

3rd Dressing, 44 x 40
Practically cheese cloth;
28s warp and 28s filling.

The reason for such a variety of constructions is that the first bandage will not stick, being of a very open mesh. This and the second bandage serve as a ventilated foundation for the third dressing, which keeps out any dirt, dust or particles of foreign matter. Specifications as to treatment requirements and tests are provided by the Government.

There is little difficulty in weaving these cloths, but owing to their flimsy character, it is necessary to have all surfaces over which the cloth runs as smooth as glass. The breast beam of the loom and all stationary surfaces over which the cloth must pass in its passage to the sand roll will cause endless trouble unless this detail is looked after. There is some difficulty in handling the cloth after it leaves the loom. The machinery of the cloth room must be glass smooth, because the slightest splinter or projection on surfaces over which the cloth passes will ruin many yards. The cloth cannot be folded in the ordinary way; it is a construction which taxes the patience of the overseer and help of the cloth room.

BENDER BANDAGE

The Bender type of bandage is used for sprains, torn ligaments and varicose veins. It is made from 2/20s hard twist warp and about 11s or 12s soft or regular twist filling. The construction is 50 warp threads and 20 picks, 36 inches wide. The yarn is run on separate beams and is drawn 2 ends of regular twist on two harnesses in one dent from the top beam, and 2 ends on two harnesses of reverse twist in one dent from the bottom beam. The weave is plain and the cloth is 36 inches wide and is usually divided in each loom into four divisions as follows:

3 bandage widths of 3 inches.
3 " " 2 "
3 " " 2½ "
3 " " 3½ "

This equals 33 inches; the rest of the width is taken up by the division spacing and selvages.

Each bandage is separated from those on each side by three empty dents, and on the two sides of each bandage is a leno tie running 1 + 1. This protects the edges after the bandages are cut and is a great aid to cutting. The 2/20s yarn, both regular and reverse, is given 40 turns per inch, which is around 4.48 times the square of the counts, giving what is termed a crepe twist.

The grey cloth from the loom has the appearance of a knitted fabric, and when immersed in water the shrinkage which takes place gives the elastic qualities so much desired. The more twist in the yarn the more elasticity there is in the fabric. This cloth can be woven on a plain loom. Quite a number of bender bandages are being woven on ribbon and suspender looms, but the sample shown is satisfactory for all surgical purposes and can be produced by any mill equipped with ordinary plain looms.

SOLDIERS' CAPES

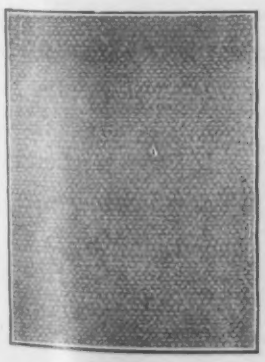
The cloth for soldiers' capes is made from the standard print cloth construction, 64 warp threads and 64 picks, 6.40 yards, and is rubberized before being made into capes. The character of the cloth is well known and there are no special features of manufacturing that require comment.

GOVERNMENT STANDARD SHEETING

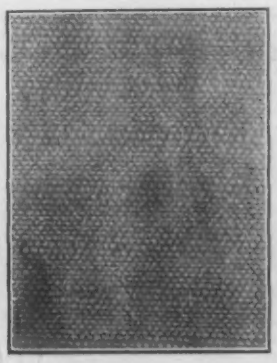
This is a light but strong cloth with a construction of 52 warp threads and 48 picks, 36 inches wide, 18s warp and 18s filling. This cloth is easily laundered, does not soil as quickly as the heavier grades, will fold up in a small compass and is cheap but very serviceable. It is, of course, made with the plain weave and none of the details of manufacturing call for explanation.

SILESIA

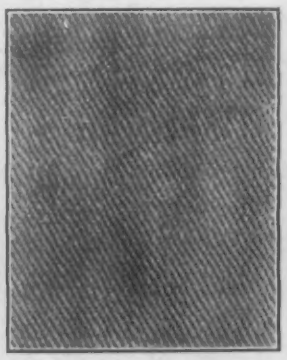
This cloth is used for army suit linings and is a 3 end right hand twill weave with a construction of 88 x 80, 30s warp and filling, made from all carded stock, to be piece dyed, olive drab shade, fast to Government test for permanency of color or shade. Testing



8-OZ. TENT DUCK



12.4-OZ. TENT DUCK



O. D. UNIFORM CLOTH

SHELTER TENT DUCK

SILESIA

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NEW YORK

formula is specified by the Government. This is a very easy weave. Nearly any ordinary cam loom equipped with the proper harness cams and a selvage motion will produce this cloth.

OLIVE DRAB SHELTER TENT

This cloth is used for the making of light shelter tents which are carried by the soldier on march. Two men use one tent as a shelter from the sun. The men lie down under the tent, which is raised only a few inches above their bodies. The weave is plain and the construction is around 64 x 56, or 64 x 60. The Government standard calls for 64 x 56, full 33 inches wide and one linear yard must weigh between 7¼ and 7¾ ounces, or 2.25 to 2.50 yards per pound; 2/22s warp and filling is used. The cloth must have a breaking strength of 75 pounds in the warp to the one-half inch, and 60 pounds to the ½ inch in the filling. The shade is olive drab and the cloth is dyed either in the raw stock or in the piece. Nearly all this cloth, however, is piece dyed. It must be a fast shade subject to Government tests; these tests to be made under the supervision of Government inspectors from formulas furnished by the Government. This cloth can be woven on any ordinary plain loom.

HEAVY TENT DUCK

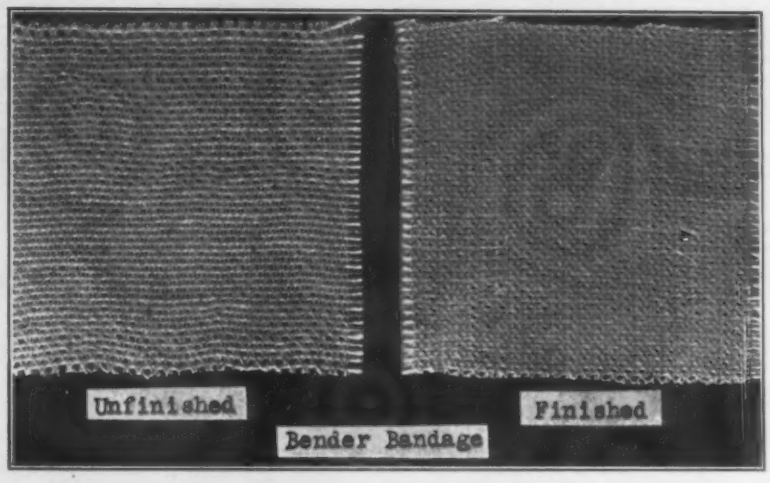
Heavy tent duck is what is termed the regulation 12.4 ounce duck; that is, one yard must weigh very close to this figure, or 1.28 yards per pound. It is used for the making of the large army tents and must be a perfect piece of cloth both in weave and yarns. It is a plain weave, requiring a very heavy loom to produce it. The construction is as follows: 46 warp threads and 32 picks, 30¼ inches in the gray, to finish a full 29½ inches. The yarn to be clean and free from knots. The specifications call for a 3 ply yarn in the warp and a 4 ply filling, but some mills are using a 5 ply yarn both in warp and filling, and others a 3 ply yarn both ways. 5/20s warp and filling and 3/12s warp and filling seem to be the range of yarns used. The cloth must have a break of 116 to 120 pounds to ½ inch of warp, and 90 to 95 pounds to ½ inch of filling, and must be dyed the regulation khaki shade, fast color, and must undergo the test for permanency of color or shade and breaking strength. Some mills are making this cloth on a 72-inch duck loom with a split selvage. This method increases the production and cuts down the cost.

DUCK FOR COVERINGS

Duck used for motor truck coverings, aero shed covers, etc., is a very heavy cloth and requires a strong loom to weave it. After weaving it is waterproofed. The construction is as follows: Plain weave, 46 warp threads and 34 picks, 30¼ inches wide to finish a full 29½ inches; 3/7s warp and filling; must be free from imperfections, such as knots, uneven weaving, etc. The breaking strength required is not given. The cloth must be waterproofed and have a weight of 28.50, and no more, per yard.

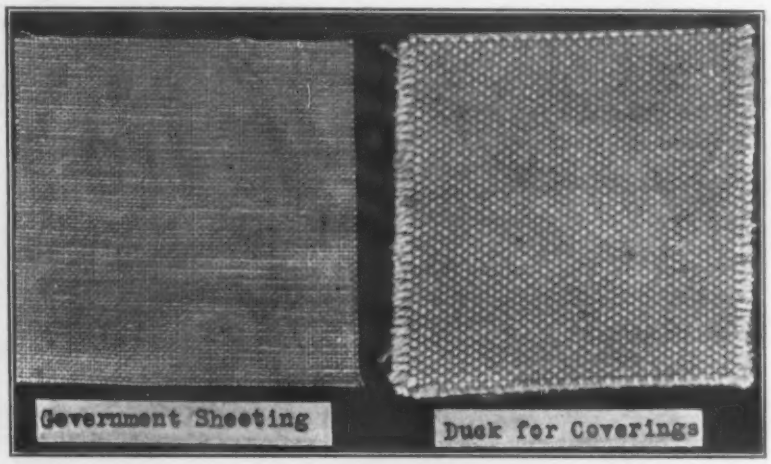
Stretcher cloth is a medium weight duck to be used for the making of stretchers for the Ordnance Department. The construction is as follows: 28 warp threads and 18 picks, 22 inches wide, 2 ply warp and filling; the same requirements as to color and breaking strength as given above for the other duck cloths. Any ordinary plain loom will weave this cloth. It is made up into stretchers 6 feet long.

Trench tool cloth is about the heaviest fabric woven for the Government, and is used in making receptacles for carrying trench tools. The construction is 26 warp threads and 10 picks, the warp being 6/8s and the filling 7/10s. The



shade is olive drab. A very heavy loom is required and an ordinary loom would not stand up long under the strain.

An 8-ounce duck cloth is used for the making of medium weight tents. The construction is 54 warp threads and 34 picks, 30¼ inches wide, to finish a full 28 inches. Regulation khaki shade, with a breaking strength of 75 pounds to ½ inch in warp and 50 pounds to ½ inch in filling is required. The weave is plain. The same requirements are demanded as to permanency of color or shade as in other duck cloths, and should be lived up to.



6½-OUNCE OLIVE DRAB UNIFORM CLOTH

Special attention must be given to the weaving of the 6½ ounce olive drab uniform cloth and also to the finishing. Uncle Sam is rather particular as to the appearance of his soldiers and there must be no imperfections, such as broken patterns, wrong hand twills, knots, bunches or uneven yarn in the make-up of this fabric. It is stated the shade must be absolutely even all through and must be fast to laundering, perspiration, urine and climatic influences, such as sunlight, air and exposure incident to military service. The tests for permanency of shade are very strict and the formulas for these tests are given by the Government. When finished the cloth must be pliable and soft, with a strictly uniform surface both in weave and color. A standard sample is supplied by the Government and when the finished product is delivered it must be fully equal to this sample. The construction is 92 warp threads and 56 picks, 28 inches wide, to weigh between 6½ and 7 ounces to the linear yard or from 2.25 to 2.50 yards per pound, to have a breaking strength of 130 pounds per inch in the warp and 90 pounds per inch in the filling.

The yarns used in the making of this cloth must be even and strong and to stand a breaking strength of 130 pounds in warp and 90 pounds in filling must be made from stock of no lower grade than strict middling, and the staple must be around 1 1/16 inch or over. In order that the cloth be soft and pliable a great deal of twist cannot be given the warp or filling. The range of counts runs around 14s warp and 13s filling, although this is not arbitrary, as long as the cloth comes up to the standard required by the Government.

This cloth can be woven on an ordinary cam loom, but it is not advisable to overload the weaver because the requirements are very strict and in order to make perfect cloth the weaver must find the pick every time the filling runs out, and every yard must be as nearly perfect as a cloth can be woven.

CORSET JEANS

The specifications for corset jeans call for unbleached cloth. Three grades show the following constructions:

No. 1—112 warp threads and 64 filling picks, 37½ in. wide; 28s warp, 35s filling. Woven with the 5-end sateen weave. The cloth is 3.50 yards per lb.

No. 2—96 warp threads and 64 filling picks, 39 in. wide; 25s warp, 30s filling. Woven with the 3-end twill weave. The cloth weighs 3.30 yds. per lb.

No. 3—Is a drilling and the construction is 64 warp threads and 56 filling picks, 15s warp, 14s filling, woven with the 3-end twill weave. This cloth weighs 2.45 yds. per lb.

All of the above cloths are easy weaves, and can be woven on any ordinary side or under cam loom, equipped with a tape selvage motion. These cloths serve a variety of purposes in an army camp. They are strong and serviceable and can be used for temporary coverings, and when soiled can easily be washed. All carded yarns are used, and the cost per yard is not very great.

BOBBINETTE AND MARQUESETTE

Bobbinette and marquesette are used for mosquito netting and canopies. Previous to the drafting of an army, bobbinette was used almost exclusively, but owing to the difficulty in securing the grade of cotton necessary for the making of threads, and the greatly increased demand for this cloth, marquesettes are now being used in large quantities for the making of canopies and for all other purposes where a netting for covering is required.

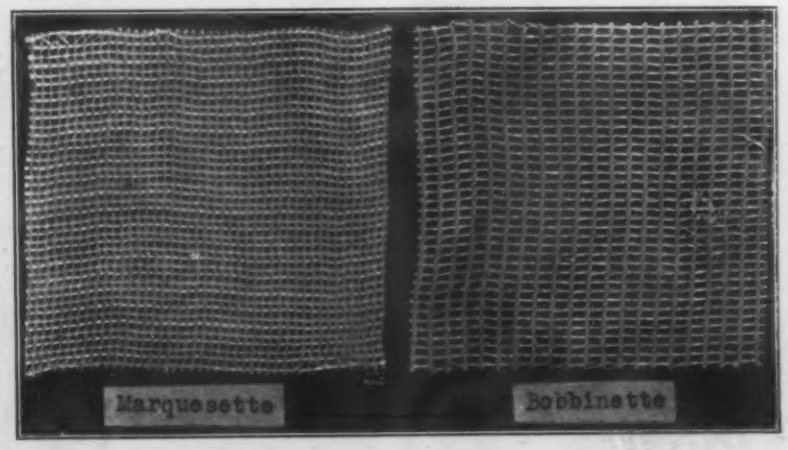
In the making of bobbinette a fine, well twisted two-ply thread is required, either 2/80s or 2/100s. The kind of cotton required to make such a thread is not very plentiful, the price is almost prohibitive, and a substitute had to be found. The marquesette formerly used for curtain purposes lends itself admirably as a substitute for the expensive bobbinette cloth. It does not require a special lace loom; any ordinary dobby loom or a plain loom equipped with 2 sets of cams will do.

The yarns used in the manufacture of marquesettes do not call for a very high grade of cotton; the pick is low and the production is high. The cloth, while not so delicate or open as the bobbinette, will stand more rough usage. Almost any fancy cotton goods mill in New England or the South is equipped to manufacture marquesette and it is a cloth that is likely to become a standard army fabric.

A bobbinette such as is used by the U. S. army for the making of canopies, is shown in the illustration. These canopies are usually located within a duck tent and are really a tent within a tent. They are for the purpose of keeping flies and other pests from annoying soldiers in warm weather and are constantly in use in warm climates, such as the Philippines, Porto Rico and the Canal Zone.

A marquesette also is shown which can be woven in any mill in New England or the South, either on a plain or fancy loom. The construction is as follows: 42 warp threads and 20 picks, 36 inches wide, 20s warp and 12s filling; 5.50 yards per pound.

The selvage should be run on a sep-



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arate selvage spool, on account of the difference in contraction when weaving. The selvage is not used in the making of canopies; ordinary tape of different widths is used for this purpose, and for this reason quite a number of mills are now making marquesettes without the usual plain selvage. This is done by doubling up the ends per dent for about four or five dents on each side. This leaves the selvage also a leno weave and when woven in this manner an extra selvage spool is not required. The cloth does not look so good when finished and put up in bolts, but as army cloths are not to be displayed on the counters of a department store much can be saved by eliminating the plain selvage and making the cloth leno the entire width.

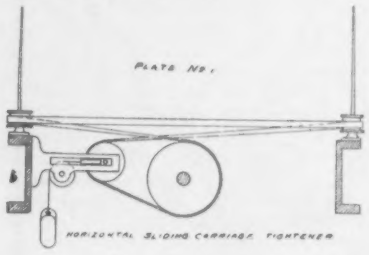
No special skill on the part of the weaver is required in the making of these cloths. A marquesette repeats on 2 picks, so that the weaver would have no difficulty in finding the pick. Three looms per weaver is the limit on 36 inch goods and 2 looms on 40 or 44 inch goods. The reason for such a small number of looms is that the filling does not last very long. Large shuttles cannot be used on account of the small shed and the nature of the weave will not admit of a large shed. The loom should not run over 150 picks, and at this speed, on a 70 per cent production, will weave 470 yards per week of 54 hours.

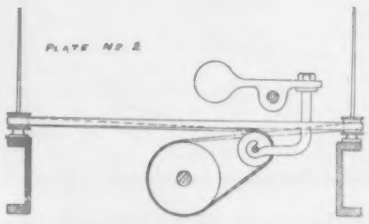
The Tape Drive in Spinning and Twisting

With Special Reference to Its Application on Spinning Frames

By *George H. Goldsmith*

THE tape drive on spinning and twisting frames has been used almost long enough to warrant the conclusion that whatever status is now involved should be regarded as a matter of incontroversial fact. To a large extent this statement is true, but there are practical questions in connection with this development that are as yet unanswered with finality.





"BELL CRANK" TAPE DRIVE

Use of the tape drive on twisting frames may be dismissed with the statement that its success is beyond doubt and is unquestionably great. The use of belts with an idler belt tightener has been practised for years on the heavier types of spindles, and where a change has been made from belts to tapes, of course this change would not involve a question of new theory, nor a discussion of how it has worked, inasmuch as the question of economy in material alone has been a decisive factor in substituting cotton tape for leather belting.

EXTENSION TO SPINNING

Since use of the belt, and later the tape, on twisters had been in vogue for years, there seemed to be but a step ahead to apply this same principle to an almost identical machine with merely smaller spindle units, a condition almost exactly met on high-speed twisters. Thus it appears that use of the tape drive on spinning frames is not definable as to its origin in a way to show an epochal development.

Yet there enters into application of the tape drive to spinning frames on a considerable scale several new considerations arising from the difference in speed between the ordinary twisters and spinning frames. In this sense we class all high-speed twisters which have hitherto used the band drive and whorl spindle at high speeds, in exactly the same class as spinning frames, notwithstanding the fact that some low speed heavy twisters have formerly used bands to drive them, as in fact some do today.

The new factors which have become incidental to use of the tape on spinning spindles are as follows:

First: Increase in peripheral surfaces of tapes relative to bands.

Second: Increase in size and bulk of whorl.

Third: Incidental elongation of spindle blade.

Fourth: Resultant greater weight of spindle than formerly required under same conditions.

Fifth: Increased number of parts in spindle and tension structure due to necessary developments.

Sixth: Increase in power incidental to factors above, and approximating 10 per cent.

Seventh: Newly encountered vibrations in high speed tape tightening devices which were used in place of heavier parts of the older twister drives.

At this time there may be enumerated in their order the main questions which have induced development of the tape drive on spinning frames as a proposed improvement over band-driven frames, and to a large extent have resulted in a very pronounced growth of its use. These are much more constant speed; much more nearly standard twist insertion into the yarn; greater reliability of spindle drive mechanism to maintain a given status of production equipment; a somewhat increased production, but more particularly a standardized production as figured in lay out.

On the negative side of motives inducing development of the tape drive spinning frame to overcome weaknesses of the old band drive, we find the slackening of round bands by slippage at knots, and by stretching of strands with consequent loss of spindle speeds, causing irregularities in twist insertion; loss of power due to drag of band on spindle whorl, this factor operating to prevent use of a suitable size whorl in many cases; need of excessive and unsatisfactory attention to maintenance of old style spinning bands, a condition involving consequent difficulties with average mill help.

TAPE TENSION DEVICES

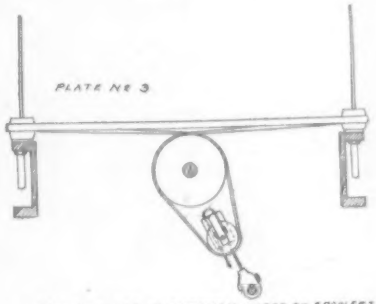
As different designers, or different machine builders, have put their individual or collective ideas into the various forms of tape tighteners, the following distinct types of structures for this purpose have become well known:

A. The horizontal or carriage type, adjustably counterweighted and having its genesis in twister and probably older construction.

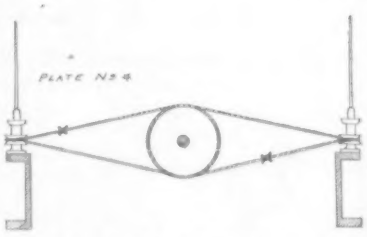
B. The bell crank, or oscillating arm type, with integral and also adjustable counterweight of common or indefinable mechanical origin.

C. The gravity carriage tension tightener applied to spoolers, to which it is rather better adapted than to spinning.

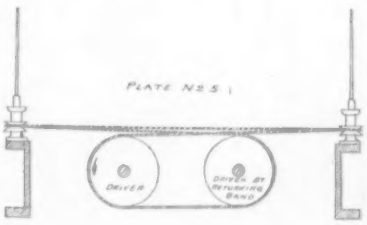
Among these types, the first mentioned seems to have achieved the greatest approval. To the writer this seems reasonable most by reason of nearer approach to freedom from destructive vibrations. This type is rigid and forces compensation for the irregular pull of the tape and its lap into the elasticity of the tape itself, transmitting the unevenness of stresses, however, into its belt tension strain onto spindle blades and idler bearings. As to just what the results of this mode of compensation may be opinions vary, but in the writer's judgment it seems reasonable to suppose that a greater extent of spindle wear would be the natural consequence. However, if this should be true, its recognition would be difficult to deduce in a problem of spindle wear complicated by other elements, such as larger whorls and longer blades with a more rigorous belt or drive exaction as a constant and beclouding factor.



GRAVITY TAPE TIGHTENER — USED ON SPOOLERS



REGULAR BAND DRIVE WITH KNOTTED STRANDS



DOUBLE CYLINDER DRIVE

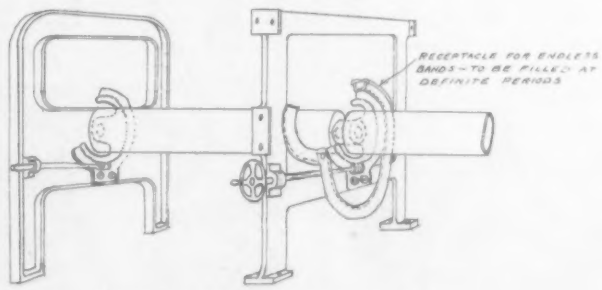
With Type B, or the bell crank arrangement, this inequality of tape tension is certainly better compensated, yet the flexibility thus achieved expresses itself as a more or less destructive vibratory or jerky oscillation of the bell crank, with consequent wear of idler bearings and idler holding structure.

Relative to Type C, there are the same vibratory stresses as are encountered in the bell crank device to which it is closely analogous. It would seem to be a logical conclusion that if destructive vibration cannot be compensated, they ought to be eliminated.

ROUND BAND WITHOUT IDLER

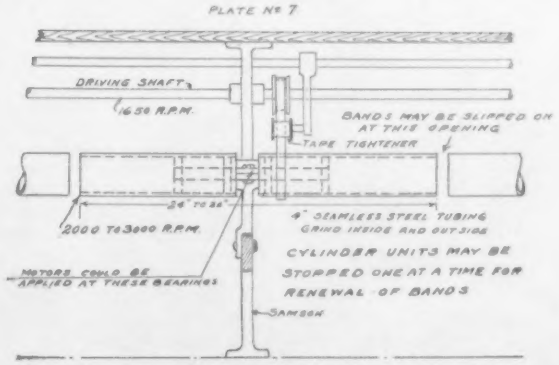
Considering then the old style round band without idler, as shown in Plate No. 4, we see that the presence of the knot or splice caused an unequal or vibratory tension which, however, was

PLATE No 6



SUGGESTED PROCEDURE TO FACILITATE USE OF ENDLESS BANDS ON REGULAR FRAMES

PLATE No 7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probably shorn of much of its damaging effect on spindle blades by the softness and elasticity of the round cotton band, and the compensatory result of the loose side of the band; a condition resulting from effect of the V grip of the whorl on the round band which enabled a loose band to drive a spindle at a fairly good speed, even though not an acceptably regular speed, and even at initial tautness of the band operated effectively to this end.

The fact that the splice of the band returned two to three times as often as the splice of tape did not materially affect the compensatory result mentioned above.

THE DOUBLE CYLINDER DRIVE

One of the most interesting efforts to throw a flexible tautness into the returning band is to be found in the double cylinder drive shown in Plate No. 5. There is undoubtedly much sound mechanical judgment expressed in this arrangement. In the writer's judgment, it was unwise to discard this device without creditable effort to improve it. The use of a suitable endless band, with such modification of double cylinder drive structure as was desirable, has probably never received a reasonable attention in the careful analysis which this problem has merited and now demands.

Reference to plates Nos. 6 and 7 will illustrate suggested possible procedures along the lines of painstaking proof of useful or questionable structures in this important problem.

PRACTICAL COMPROMISE

When it is found that unequal band or tape stresses cannot be wholly eliminated, the proposition to go as far as possible in the direction of elimination, and then to be influenced, to a reasonable degree, by limitations of manufacturing, costs, competition, etc., is surely in order. Yet it is probable that much more than a compromise is possible. There is probably an open door to a satisfactory band drive.

A smooth drive is demanded. It would seem that spinning frame evolution has reached the point where one of the two alternatives is imperative; either perfect a spindle drive, or evolve a new type of spinning frame.

It may be assumed that not all of the factors presumably responsible for the development of the tape drive are present in any one set of conditions. Neither were all of the faults of the band drive existent with sufficient uniformity to enable the statement that improvements in the tape drive have ever completely overcome these objections without compensating difficulties of a considerable extent existing in their places.

APPROVAL OF TAPE DRIVE

It might seem to be a conclusive fact, establishing the unquestionable superiority of the tape drive over the old band drive on spinning frames, to state that at the present time 80 per cent of new spinning equipment employs this mode of power application to the spindles. Yet a frank and open minded analysis of the whole subject, at a time when a sufficient number of years have elapsed since the emphatic trend towards tape drive began, may reasonably bring up for discussion the following practical queries:

Acknowledging standardization of twist—has this produced results which warrant all the costs reasonably to be charged against it?

Has the value of standarized production justified all the costs which may have reasonably been charged against it by a commensurate gain?

Does the life of tape-driven spindles justify the conclusion that they are stable enough, as compared to the old band driven type, to warrant the cost which may be involved in spindle deterioration difficulties?

Does the increased cost of tapes fully warrant substitution of this more expensive material for the much less expensive bands, and warrant abandonment of use of carefully selected bands, and such assistance in applying them as may be had from tension measuring devices to-day?

Does the greatly extended complication of the tape-driven spinning frame compare sufficiently favorably with the simplicity of the band frame to warrant the fud-collecting structure now in existence, as compared to the simple cleanliness of the band drive under dirty mill conditions?

Are the vibratory stress problems commonly encountered in tape tightening mechanisms sufficiently low in their destructive results to offset the advantages which may reasonably be granted this system?

Does the large increase in dead weight of frames, and consequent vibrations which they set up, involving heavier frame construction throughout the spinning frame, find a complete justification in the common advantages ordinarly claimed?

Is the more positive drive of the bobbin as convenient and satisfactory a thing for the operatives fingers to handle, and is this factor to be ignored?

Could not a greater gain have been registered more positively by a better and more conservative development of a spinning machine along other lines.

In fact, does the intensive development of the tape drive represent a costly effort for a questionable stake?

CAPRICIOUS JUDGMENT RULES

Inasmuch as every man whose opinion is worth while would answer these queries in his own way according to his own peculiar mode of thought, the mere statement of these questions is perhaps as far as any useful mind would care to have us go. Yet consciousness of the breadth of possible development, and a realization of the efficiency of modern thought induces a few steps further along lines which may be roughly summed up as follows:

That evolution of the spinning frame during the past decade, giving full credit to results achieved with the tape drive, and the excellent progress in manufacturing procedures, has practically stood still.

That thorough consideration of the inefficiency of the present day mode of spinning, doffing and weaving yarn would have warranted dealing with the whole problem from a broader and better motive.

That manufacturing, production, and social considerations have warranted a fundamental and drastic modification of the spinning frame and its fellow, the loom, to an extent which would have made effort spent during the last decade on the tape drive development much more useful and rational, had they been directed along other lines.

EVOLUTION VS. SCIENTIFIC DESIGN

Without going into an extensive discussion of the details involved, in the writer's judgment this development of the tape drive has been the result of the persistent demand of more or less impractical mill men, and does not represent a scientific effort by competent designers to develop a machine along scientific lines. In fact, this status of the spinning frame today is one of the best illustrations we have of the questionable policy of allowing expensive machine design to be dictated by men of local vision and too limited environment, while broad gauge designers are hog-tied by the dictum of "give the mill men what they want."

Now it might reasonably be suggested in answer to the propositions that obvious faults in the old band drive have been met by unwarranted devices in the tape drive that practical suggestions are in order. The answer to this proposition, in the writer's judgment, may be divided into the following statements:

SUGGESTED IMPROVEMENTS

There is no complete cure for all of the evils of the band drive, and more particularly no serious complication of the drive itself would constitute even a tolerable palliative, if viewed impartially.

There has been attempted the most rational palliative for ills of the band drive in the use of endless bands, though their use has never been supplemented by an adequate development of spinning frame structure to facilitate it; a category of effort to which, in our judgment, the past decade might logically have been devoted.

There is ample opportunity, first to perfect the endless band, using high grade and if necessary expensive materials, not necessarily cotton yarn; and second, a comparatively open door to proceed with the development of structure which would enable the facile application of the endless band to spinning frames.

There is still the possibility of developing a suitable splice to enable a suitable band to be applied to regular frames without modification.

In striving toward this objective there are probably several lines of logical effort: Two or three are apparent at once and are illustrated and explained herewith:

First: There is the combination of a system, defined by the time, for the replacement of all bands at once, and a structure to make this reasonably easy. See Plate No. 6, foot end only.

Second: A well developed structure which would enable placing bands into a convenient place, being strung around the cylinder and housed from fud, and easily accessible to replace only individual bands as fast as they break. See Plate No. 6, at samson.

Third: There is the more highly developed unit cylinder section upon which the placing of bands is a simple matter. This is shown in Plate No. 7, in which a further simplification is suggested by use of specialized motors to drive cylinder sections.

These three suggestions are only a few of those which probably would have given a suitable answer to requirement of palliatives for the evils of band drive. They do not pretend, any more than the last decade of spinning evolution has pretended, to meet with practical answers very serious faults in ring spinning frames. Probably the only adequate answer to these questions is a rational evolution of the whole process of spinning, possibly involving a radical change in principles. Will this be left to foreign designers? Or is there a new concept in America to-day to do it here? Or is the world too busy to bother with this minor problem at this time?

Silk Used for Cartridge Cloth

Four Weights of Fabrics Similar to Fine Burlap Made from Noils

CARTRIDGE cloth is divided into two classes, cartridge cloth and cartridge igniter cloth. According to the Government specifications, the former may be made either of pure silk, mohair or wool. As a matter of fact, pure silk only has been used so far, for a variety of reasons. It is specified, however, that the cartridge igniter cloth must be of pure silk, without the admixture of any other materials except those necessary for sizing the yarn. The fabric in both instances, must be not less than thirty-six nor more than seventy-two inches wide.

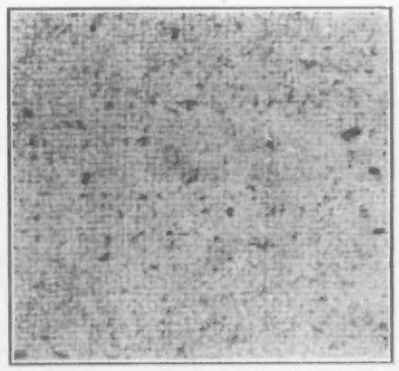
The fabric (cartridge igniter cloth) used for the powder bags in the big guns must be of silk, for the reason that the silk is consumed by the explosion of the powder, leaving no ashes and no sparks. The latter would be absolutely fatal, as may easily be seen. A spark remaining in the gun when the next charge was put in would have results not at all to be desired. Silk disappears absolutely and entirely at the explosion of the charge. It is consumed and disappears into the air as completely as the smoke of yesterday's cigar. Nothing else has as yet been found that satisfies this requirement.

FOUR WEIGHTS MADE

On account of its lower cost, noil yarn has been used for this purpose. It is of rather a coarse size, about corresponding to 10s single cotton yarn. The cloth iself is somewhat similar to a rather fine burlap, closely woven, so that no powder can sift through. Though the yarn is coarse, the weaving of the fabric is understood to be a delicate matter, as the reed must be so adjusted as to beat the filling up tightly, and insure the required closeness of weave. For reasons not clear to the lay mind, also, there must be a slight roughness to the fabric, so it is not possible to use finer yarn nor to make a fabric with an absolutely smooth surface. As designated by the Government, the cloth is woven in four different weights: Super Light, Light, Heavy and Extra Heavy Weight.

Specifications for both cartridge cloth and cartridge igniter cloth were revised November 21, but are not printed here, as they are not for general public information.

After the fabric is woven, there remains the cord for the closing of the bag. This is made of spun silk yarn,



CARTRIDGE CLOTH WOVEN ACCORDING TO SPECIFICATIONS ISSUED PREVIOUS TO NOV. 21, 1917

braided to form a narrow lacing or cord. It must be strong, as the bags, when filled, are heavy, and must be securely fastened.

All this, as is apparent, uses up a considerable amount of spun silk and noil yarn. The demand is not new, as powder bags in recent years have been made in this way. But the entrance of this country into the war, as well as the duration of hostilities previous to that time, have greatly increased it, and it will increase still more with each month of the war.—*Silk*.

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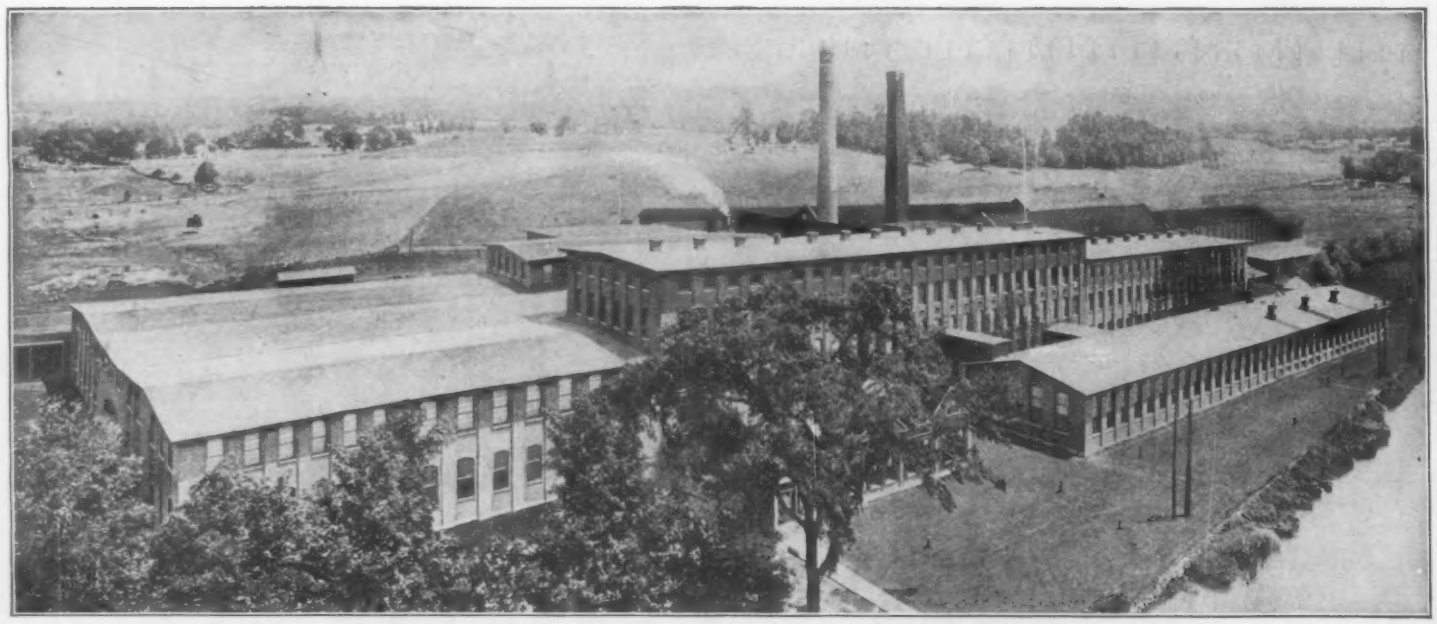

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UNFORTUNATELY it is not given to men to foresee the future. The two things that stood between those connected with the yarn market and great opportunities during the year was their inability to anticipate coming events and to draw correct conclusions after the fact. The announcement of Germany's ruthless U-boat campaign stunned into inaction an already disorganized market and trade stood still for want of a Moses to point the way to the land of promise. Following the declaration of war on Germany opportunity again awaited the man of vision with the means and courage to lead the way. Perhaps this delay was an advantage to the trade at large, but time was wasted as business lagged, as was later proven.

CONTRAST OF CONDITIONS

The contrast between conditions existing during the early months of 1917 and those obtaining at this writing shows such a drastic difference that they might belong to different eras rather than covering a period measured by months. The market for January of last year showed no upstanding element of solid strength—prices wabbling, quotations varied and uncertain, and the market for futures softening in spots under the first signs of pressure. Buyers at that time evidenced a general policy of aloofness under the impression that prices would go lower. There seemed to be a disposition on the part of certain sellers to accept orders slightly under ruling levels—then called high. Individual mills, on the other hand, refused to agree to any recession from their set prices, and business was in a measure restricted for the time being.

THE MARKET WAKES UP

That the spinner's position was sound in holding out against lower prices was demonstrated early in the second quarter of the year when the demand for yarns improved and the gradual rearrangement of values brought a higher level of prices, prior to the declaration of war. Immediately following that event the market began to look alive. Buyers of weaving yarns shed their reserve and began pecking at the market in a small way at first, but with an evident interest that aroused big expectations in selling quarters. Manufacturers of underwear took to figuring on Government contracts, and options on yarns grew in volume, giving rise to no little perplexity when options expired before awards were made. It was evident that knitting mills had great expectations but were awaiting further confirmation. Prices were constantly going up.

BRAKES SET AGAIN

An unsettled cotton market in May set the brakes on business temporarily with prices holding relatively firm during the relaxation. Following upon the advance of raw cotton early June prices made a further advance, although business showed no appreciable increase. Prophets who had predicted 25-cent cotton as a midsummer probability began to revise their figures to a higher plane. Mills that had refused orders except on their own terms, and who were not well covered with business far into the future, seemed to be in the best position to reap a profit on the probability that buyers would be forced into the market by the rapid upward trend of prices. With every improvement in business or without it, prices continued to advance. Spinners were optimistic and showed it.

The midsummer dull period arrived according to schedule and before the promising June revival was developed to full speed ahead. Reference is still made to July as the dullest July of recent years. It seemed as if business was comatose so far as civilian interest was concerned, and this quiet condition continued throughout the month. Certain commission house interests grew restless under the strain of dull business and an erratic raw cotton market, and undertook to start something. Spinners, however, stuck to their previously demonstrated optimism, yielding only where overruled, so that the old bargain price, in some cases, prevailed over better judgment.

AT BARGAIN PRICES

When price cutting got started it went the limit and during the month of August there were price variations reported of fully ten cents a pound, on private terms. A certain instance was cited wherein a buyer refused to close at 31 cents because 28 cents had been predicted as a probability of the near future on a certain count he required. He finally covered at 45 cents. That August slump ended the silly season and a saner reaction came in September. Cotton jumped up and sellers in general began to realize what was coming. Government requirements grew enormously. Reluctant buyers were still obstinate but they bought.

GENERAL IMPROVEMENT ARRIVES

Once the general apathy was overcome it was overcome for good. The market from mid-September showed the gradual growth of a greater business under the spur of a continuous upward tendency of prices. Government needs entered so extensively into the movement of cotton yarns during September and October that the volume of business transacted reached a total that gave a strong support to the market without special surface manifestations in current business. At the same time civilian buyers were overcoming prejudice and perplexities while trying to make up their own minds.

BIG TRADING STARTS

So the barriers gave way before a more active business and a strong cotton market. The majority, no longer reluctant and feeling assured of a boom, proceeded on the conviction that a period of prosperity and high prices had come to stay. Thus the market for the year entered on its final lap to round out a record unparalleled since the Civil war, if ever. November staged the big show. Knitters, already convinced that there was no other course to pursue, proceeded to cover their requirements to the best possible advantage in order to secure deliveries at dates desired. And some were reported to have bought for deliveries into the third quarter of 1918. Freight embargoes and delays in transportation became a growing menace to all forms of freight traffic, forcing the Government to take control of railroads, compelling the conclusion that transportation also is uncertain as well as markets. Transportation until the close of the year continued to be unsatisfactory.

LOOKING BACKWARD

Looking backward it is easy to see where mistakes were made, but these mistakes were errors of judgment on the part of individuals and, while individually costly, were not colossal nor fundamentally vital to the market. If men were all of one mind there would be neither life nor interest to the market. But those, in every instance, who did a legitimate business on the market have had a prosperous year. Those who undertook to buck the market paid for the blunder, have had a percentage to charge to experience and of the profits. Looking ahead the New Year, established on a solid foundation, looms big with possibilities.

TIRE FABRIC YARNS

The policy of the British Government in prohibiting the reshipment of Egyptian cotton from British ports confined shipments of that staple to the port of Alexandria. As terms at that port were f. o. b. Alexandria, the risk, insurance and excessive freight rates placed an almost prohibitive cost on the staple and as a natural and not unexpected consequence the tire fabric trade was interested in a working substitute, and American peeler was adopted as adaptable for the purpose. Meanwhile, after the resumption of U boat ruthlessness, the price pressure on Egyptian yarns grew burdensome while, at the same time, receipts of Egyptian cotton fell off. The practice of substituting peeler yarns became more general and the tire cloth business was regarded as a growing feature of the yarn market.

SPINNING THEIR OWN YARNS

Certain American spinners, in the judgment of factors in the tire cloth trade, failed to show a proper consideration for tire cloth manufacturers, who regarded the cost of all yarns for their purpose, both Egyptian and American, as extravagantly high, so that, in a number of cases they gradually took up the spinning of their own yarns. Although, at this writing, no tire manufacturer is rated as 100 per cent balanced in spinning his individual consumption of yarn, a certain number have already approached that position and the trade is said to be spinning a considerable proportion of its needs or will be in that position early in the new year. Thus far the trade regards its movement in substitution as a development that will effect the future and which will strengthen its position.

The tire fabric trade, it is said, has not felt any undue famine of Egyptian yarns as there were large stocks of the staple warehoused or at the mills at the beginning of the year and consumption has been fed up to a point above starvation by individual cargoes from time to time. However, unless the unexpected happens, 1918 is expected to see peeler yarns, which were adopted as an experiment, gradually assume first place as the principal ingredient in the construction of tire fabrics. To what additional extent the capacity of tire looms may be needed by the Government in the production of duck is still a moot question, but, according to recognized authories fully 25 per cent are at present engaged and every firm in the tire fabric trade is doing its bit to the best of its ability and the extent of its machinery.

YARN COMMITTEE APPOINTED

In the month of June the Council of National Defense in order to complete its complement of duck needed large quantities of hard cotton yarn, and yarn spinners were called on by the Government to co-operate. This co-operation led to the choosing of a committee through which all business on coarse yarns up to 16s should be conducted. The committee appointed was composed of Andrew S. Webb, W. B. Moore and J. A. Mandeville. This committee was instrumental in moving a large aggregate of yarn, immediately following its appointment, to manufacturers who were starting or about to start on Government contracts. Manufacturers on Government work continued to place their yarn business through the committee, acquiring yarns at better prices than manufacturers engaged on civilian fabrics, and securing accommodating deliveries. In September, however, the volume of business falling short of expectations at the time the committee was appointed, the business, in fact, amounting to but one-fourth of that at first anticipated, the committee suggested to the Council of National Defense that it should be released temporarily, subject to the Council's call at any time deemed necessary to again begin operations. This suggestion was acceded to and the committee temporarily relieved.

Combed Yarns Break More Records

War Business Helps Spinners to Control Market —Smaller Advances Than in Year Before

MOST buyers of combed yarns retain dim recollections of having purchased 10s combed peeler cones at 20c. and 2-60s combed peeler skeins at 42c., but most of them would be forced to refer to their note books to verify the fact that these purchases were made only three years ago. The experiences of both spinners and users of yarn since that period have been extremely trying, and, despite the fact that net profits have been large during the last two years, it is doubtful whether there are many members of the trade who would care to repeat these business experiences.

SPINNERS HAD WHIP HAND

Viewed in retrospect, it can be seen that the year 1917 was one in which sellers of cotton yarn almost constantly held the whip hand over buyers; that is, practically every factor of importance influencing the market worked in their favor. This would not have been the case if selling prices of yarns had been determined by the price of cotton, but it is a well-known fact that for nearly two years selling prices of yarns have been determined by supply and demand and not by the price of the raw material. There were only two radical declines in raw material prices during the year: The first came early in February when there was a slump in spots of 3c., while futures declined fully 5c. per pound. The other occurred during the latter part of August and early in September when there was a decline in spots from a maximum of nearly 28c. to a minimum on September 8 of 21¼c. The first decline was slow to affect yarn prices because of the extremely well sold condition of most spinners, and it was not until March that yarn prices had sagged materially; even then the decline seldom exceeded 5 per cent and there was an almost steady recovery in values from that period until July.

FALL MONTHS MOST CRUCIAL

The most trying part of the year for spinners came in the late fall and was largely due to uncertainty regarding the

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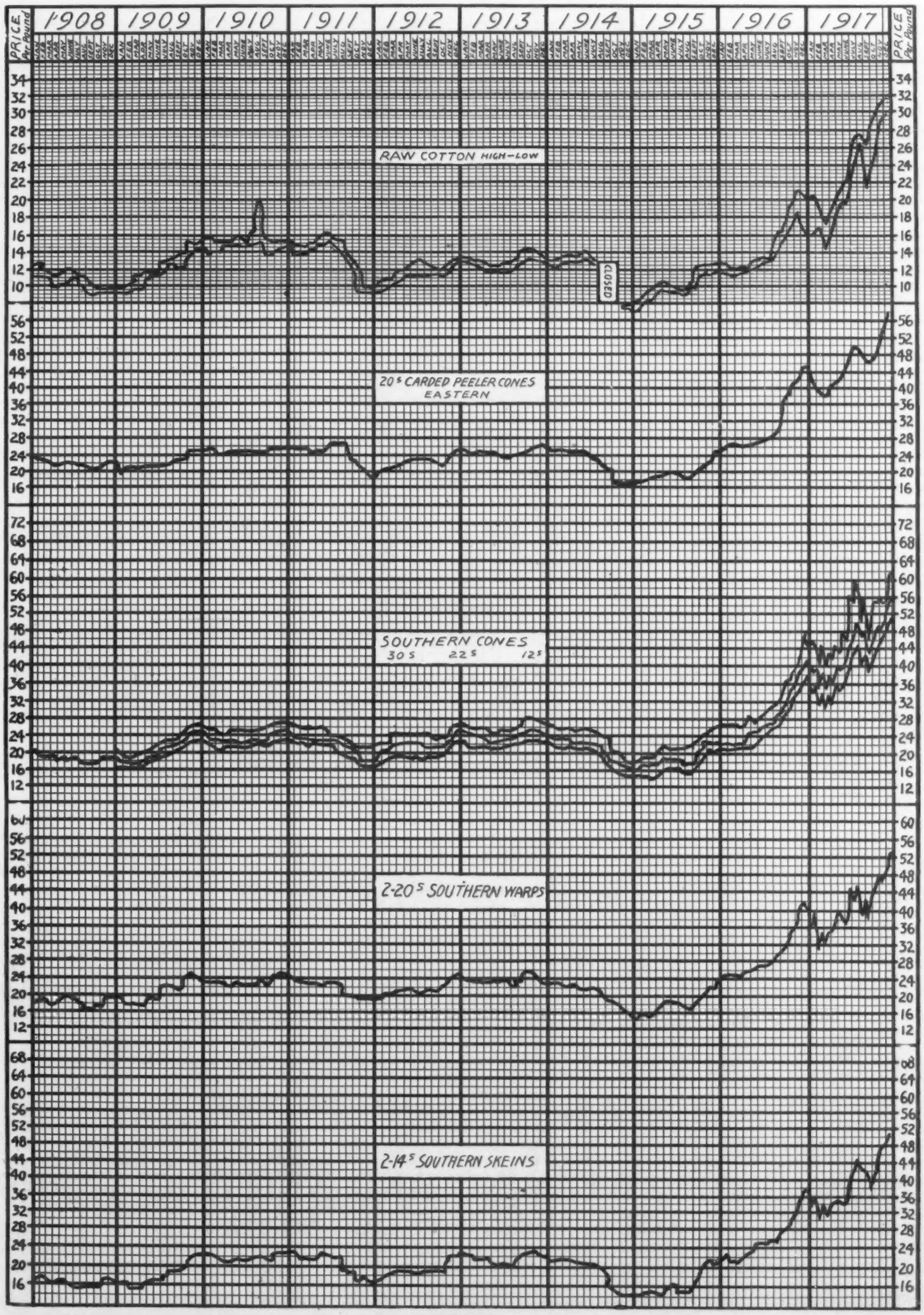

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size and price of the new crop. Large numbers of buyers were influenced by the high prices touched by yarns in July to operate in a hand-to-hand manner all through the fall. Knitters were particularly notorious for this policy and so were tire cloth manufacturers; the attitude of the former was largely speculative, while the latter's action was due to the prospect of a marked shrinkage in demand for their products. It was not until November that buyers commenced to give up hope of lower raw material prices and commenced to purchase yarns in a large way for future delivery. The turn in the market, however, was called by two or three large dealers who placed contracts for millions of pounds of carded and combed yarns in the South at or close to bottom prices for the fall. Undoubtedly some of these orders were of a speculative nature, but most of them either represented purchases to cover contracts in hand or that were booked shortly afterward. Since these dealers' operations plugged up the weak spots in the market there has been a steady advance in prices that has carried them to the highest point for the year, and this is equivalent to stating that they are record values for the market.

HAND-TO-MOUTH BUYING

Until the transportation situation became serious, those buyers who operated in a hand-to-mouth way probably owned their yarns at prices which would average as low in price as those of buyers who placed long-time contracts and failed to secure much yarn at the lowest prices. An exceptional buyer may have purchased in March and in November and avoided the high spots of the market, but it is a well-known fact that the majority bought on the advance in each instance rather than on the decline, with a resultant high average purchase price. This simply confirms the previous statement that sellers have held the whip-hand throughout the greater part of the last twelve months.

ADVANCES LESS THAN IN PREVIOUS YEARS

Advances of most counts of yarn in 1916 ranged from 50 to 75 per cent, whereas during 1917 the range on combed and fine count yarns was between 25 and 50 per cent. Of course, the percentage basis of figuring is somewhat misleading, and it is quite true that the smaller advances for 1917, coming as they did on top of previous advances, have required more radical readjustments in prices of finished goods. It was because they feared to mark their new lines at the radical advances made necessary by yarn prices that buyers delayed purchases of the latter too long and thus curtailed their profit margin. Buyers of yarns and of finished goods have combatted every new advance, claiming that their trade would not pay higher prices, only to find ultimately that their fears were unfounded, and that they could have netted much larger profits if they had covered promptly.

Most Profitable Year for Tire Fabrics

War Demands and War Restrictions Have Checked Expansion Temporarily

By *W. Irving Bullard, Textile Department, Merchants National Bank, Boston*

MANUFACTURERS of automobile tire and cord fabrics have witnessed more vital developments in their industry in the past year than many realize, and the recording of certain changes which have taken place may be of current as well as of permanent interest. The year just closing has been the most successful, from a financial as well as industrial standpoint, since the beginning of this division of our great textile industry; and, in spite of the many uncertainties in the motor industry, there have not developed as yet any definite plans for the curtailment of production of these special fabrics beyond the present employment of about 28 per cent. of the tire fabric looms in the country on army duck.

One year ago the consumption of automobile fabrics so largely exceeded the production that broad programs of expansion were conceived and immediately adopted. Many millions of dollars have been spent this year in buildings and machinery for the manufacture of these fabrics. As our war preparations began to develop it became apparent to the rubber companies that the demand for pleasure vehicle tires eventually would be curtailed and contracts for tire fabrics canceled. Just as curtailment of production of tire fabrics and stoppage of looms seemed imminent, the Government requisitioned 25 per cent. of the tire fabric looms of the country for the manufacture of army duck. In the meantime the rubber companies were increasing their sales and the demand for tires became record-breaking each month. Notwithstanding the enormous increase in demand for their products the rubber companies curtailed production in order that 25 per cent. of the tire fabric looms might be used for the manufacture of much needed army duck.

Another development is found in the long staple cotton situation. During the latter part of January, when war with Germany could be foreseen, Sea Island cotton dropped suddenly to 48c. for extra choice and fancy, and more than 5,000 bales were purchased by New England tire yarn spinners at this price. With this floating supply absorbed, prices began to climb steadily until 76c. per pound was reached last month. In the meantime 10,000 acres of land in Arizona had been irrigated and planted to Egyptian cotton, and now a harvest of more than 12,000 bales is materializing to partially offset the great difficulties experienced in securing genuine Egyptian cotton from Alexandria.

COST-PLUS CONTRACTS STABILIZE TRADE

The tire fabric industry is almost an infant as compared with the other divisions of the textile industry, and yet there has been more real economic progress in this field than in any other. For the past ten years market prices of tire fabrics have depended largely upon the laws of supply and demand, and profits have been larger than the average of our cotton mills. This year, when so many disturbing factors developed in our industry, a number of tire fabric mills entered into long term contracts with rubber companies for the sale of their output on a basis of cost plus a certain definite profit. These arrangements have stabilized the industry and it would not surprise the writer if manufacturers of other lines should adopt this method of merchandizing.

RESTRICTED MOTOR PRODUCT, BUT NOT USE

Many of us have been looking for the restriction of production and use of automobiles. It is now generally conceded that the 1918 production of passenger automobiles will not exceed 50 per cent. of the quota expected, but as yet there have been no restrictions placed upon the use of passenger cars, and with the railroad transportation of the country so thoroughly congested, it is entirely probable that the use of motor cars will be greatly stimulated. The writer believes that the curtailment of passenger trains will be so great that motor passenger and truck lines will probably be established as auxiliaries and feeders to railroads.

INCREASED USE OF CORD TIRES

One of the greatest rubber companies in the world has established beyond a doubt that pneumatic tires made of cord are far more economical and satisfactory for army trucks and freight trucks than solid tires. They have proved it by establishing an express route between Akron, Ohio, and Boston, running on schedule time and making the round trip in the same time that it takes for one-way express from Akron to Boston. This cannot fail vastly to stimulate the demand and consumption of cord fabrics.

SUPPLY HAS OVERTAKEN DEMAND

There is no doubt but that the expanded manufacturing facilities have overtaken the demand for tire fabrics under war conditions, but, if the war had not developed and this country had continued its normal progress, tire fabric manufacturers would to-day be planning for further extensions in 1918 as a result of the continuous growth of the tire fabric industry.

Year 1917 in Distinct Class

Fall River Mills Show Increased Earnings and Better Financial Status

WHEN Josh Billings warned against yielding to the temptation of foretelling the future, or of taking the light given out by the lamp of experience to read what destiny has in store he wrote the laconic sentence, "Don't profesy onless you no." Fall River has many residents who disregard the counsel, for they have been heard to say that "never again will the city experience a counterpart of manufacturing conditions such as put the year 1917 in a distinct class for remarkable conditions." Irrespective of the supposed lack of honor attaching to wiseacres with a propensity for peering into the future, the Sir Oracles are acclaimed as speaking by the book of prophecy.

READJUSTMENT TO COME

There is a solid basis of fact upon which to predicate the assurance of the probable future of local history made in 1917, to repeat itself. The most compelling reason is the improbability of the recurrence of an international embroglio without precedent. Preparation of the Allies was hurried in each instance, and the waking up for the lack of preparedness in wearing apparel and surgical needs as in munitions entailed a tremendous outlay not to be counted upon as an irreparable characteristic of the strife during the period of its prolongation.

With the artificial stimulus to overexertion and abnormal productivity reduced, it is reckoned that there will be a cutting down of the immense profits in cloth making here as determined by the law of supply and demand as it affects the cotton goods market. It is recognized that there will be prosperity, but nothing which will approach that felt the past twelve months and still in progress, as appears from the trouble of consumers to place contracts for cloth at attractive quotations.

EARNINGS RADICALLY INCREASE

Corporate earnings have increased by leaps and bounds, dividends have been paid on a scale of munificence so much beyond belief as to possibility as to cause many boards of directors, previously scored for illiberality and ultra-conservatism in disbursing profits, to be described as the most generous of mortals whom it would be good policy to restrain in their beneficence lest there be little provision against the day of need; and wages have gone skyward with a frequency, an ease and a prodigality which have drawn forth from many treasurers serious speculation as to the probabilities when the ultimate recession has been reached and normality restored. It is hard to find an official who does not say that the limit to the wage ascension has been reached; and one may garner from the gossip the development of a resolute purpose to engage in no effort to equal the 1917 record for cash dividends no matter what may be the profits accruing from a bounding market.

The moral effect of caution, with thoughts on the orderly future, ought to be the repression of the inordinate desire of labor to insist on a fourth breaking of records, according to employers' reasoning. That the task of stabilization is going to prove difficult is recognized. Some treasurers and directors feel that they must recoup losses suffered by stockholders, either through the passing of dividends or on account of the reduction in percentages. Publicity of a more pleasing kind than the notoriety under which they labored is apt to be sought through unusual disbursements, it is admitted, though there is a powerful warning against being too eager for the reputation of having made good against adversity in the dawning of the day when treasurers wished they had accumulated surplus first.

LABOR DISTURBANCES

Industrially the year was free from grave trouble or its possibilities save at its close. The refusal of the mill men to accede to the Textile Councils' demand for an increase of 15 per cent in the wage schedule, to which the loom-fixers and the spinners were opposed at the Council's meeting, was followed by an offer of 12½ per cent with the provision that a Federal arbitrator be asked to investigate conditions and confirm or contradict the mill men. The operatives might have been less arrogant if they had not been urged by a clergyman to insist on the full measure of what in his sensational and unprecedented sermons he described as justice in the face of most considerate treatment of the help during the depression of 1909-10, and subsequently.

There were sporadic disturbances of the industrial peace during the year, only two of which, however, amounted to anything as regards numbers. The Industrial Workers of the World fomented a small strike at the Border City plant. At the Lincoln mills the weavers struck, only to be worsted; at the Fall River Iron Works Co.'s mills an effort was made to unionize, but it miscarried, and at the Fall River bleachery the folders and others lost good jobs through heeding the counsel of non-resident agitators to organize and fight.

FINANCIAL CONDITIONS IMPROVE

Financially the twelvemonth was pre-eminent. Instead of fifteen corporations carrying undischarged obligations, only eight are left in the debt-paying class. If the rate of progress made the past year should be maintained, it is doubtful if, when balance sheets are compared at the close of the fiscal year for

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1918 more than two concerns shall have failed to emerge. Of the eight the Barnard Mfg. Co. is worst off, for it owes $47,406. Its 1915 statement shows unpaid claims of $449,914. The Ancone Co. cut off $64,744 from its pile of debits.

The most notable achievement in gaining belongs to Seth A. Borden, treasurer of two corporations, both of which he organized. The Hargraves Mills, which had been hard hit when the business reversal developed after the 1907 boom, was well situated when activity struck the cloth market. Its warehouses met the pressing need at prices so lucrative that only $25,517 remained of an incumbrance of $239,019. The Parker Mills was bettered to the extent of $213,186, a net surplus of $1,605, placing the corporation among the seven which entered on a new alignment.

The Wampanoag Mills reduced its indebtedness by $132,302; the Seaconnet Mills, which owed $236,694 in 1914, and $244,713 in 1915, is a debtor to the amount of $108,022, or $87,223 less than in 1916; the Arkwright Mills, which discouraged its stockholders in 1915 by a showing of $267,248 in liabilities and passing dividends quarter after quarter, may free itself of the $135,616 remaining of a total of $78,595 greater last year. The treasurer cancelled $23,063, now owing $75,524.

The total indebtedness is $828,606, and the total betterment as affects the eight, in which the new Foster Spinning Co. is included, is $721,155, but to know the extent of the full improvement one must not fail to take cognizance of the change in the status of the six companies which converted themselves from debtors by creating surpluses.

The American Linen Co. replaces $77,270 of deficit with a surplus of $87,295, a difference of $164,565; the Charlton Mills, $15,017 of deficit with $210,446 surplus; the Lincoln Mfg. Co., $154,776 of deficit with $162,080 surplus, a difference of $316,856; Narragansett Mills, gain of $73,153 by exchanging $23,017 of deficit for $50,135 surplus; Shove Mills, $34,806 of deficit with $20,878 surplus; Stafford Mills, $155,303 of deficit with $86,264 surplus, a change of $241,568.

The old year surpassed its immediate predecessor extraordinarily. Surpluses of $11,206,490 were reported by treasurers against $6,726,822 in 1916. When the reductions effected in indebtedness are reshared, from $2,302,426 to $721,155, or $1,581,271, it appears that 1917 has an advantage of $6,060,939. Two corporations figure in the million class with reserves, the Fall River Iron Works Co. (now the American Printing Co.), with $1,021,217 and the King Philip Mills, with $1,087,015. The first named increased its surplus $355,735, and the King Philip $237,398.

Half millions are possessed by the Chase Mills, $599,043, a gain of $263,198; Durfee Mills, $836,460, a gain of $225,858; Merchants Mfg. Co., $513,770, increase of $191,892; Sagamore Mfg. Co., $875,628, added to by $319,907; and the Union Cotton Mfg. Co., $664,305, a sum $191,969 greater than in 1916.

Comparison as respects returns to stockholders shows no statistics to warrant the naming of a close second. Cash dividends of $4,291,360 on $37,911,700 of capital were disbursed, compared with $2,373,493 the year before, and $2,701,875 in 1907, the possessor of the record for large returns hitherto. The Cornell Mills paid 26 per cent on a capital of $400,000; the Richard Borden Mfg. Co., 35 per cent; the Sagamore Mfg. Co., 40 per cent; the Luther Mfg. Co., 22 per cent; the Flint Mills, 20 per cent; the Tecumseh Mills and the King Philip Mills 19 per cent; the Union Cotton Mfg. Co., and the Merchants Mfg. Co., 16 per cent; the Weetamoe Mills and the Chase Mills, 15 per cent; the Davis Mills, 14 per cent; the Mechanics Mills and the Osborn Mills, 13½ per cent.

Notability attaches to 1917 likewise for the unusual number of stock dividends. They totalled $2,625,000, and were declared as follows: Border City Mfg. Co., $200,000; Davis Mills, $625,000; Granite Mills, $250,000; Lincoln Mfg. Co., $375,000; Merchants Mfg. Co., $300,000; Sagamore Mfg. Co., $600,000; Shove, $275,000. The year before the Stevens Mfg. Co. was the only corporation to declare a dividend on its capital of $750,000, which was raised to $1,250,000. The standing of the corporations as regards surpluses or debts is detailed in this table:

Corporation	Surplus	Gain	Profit-Loss	Decrease	
American Linen Co.	$87,295	.....	$302,352	.....	.....
Ancona Co.	.....	.....	56,277	$136,765	.....
Arkwright Mills	.....	.....	209,114	135,616	.....
Barnard Mfg. Co.	.....	.....	263,769	247,406	121,666
Border City Mfg. Co.	238,688	138,298	290,660	.....	.....
Bourne Mills	113,991	93,681	151,215	.....	.....
Chase Mills	599,043	263,198	318,318	.....	.....
Charlton Mills	210,446	.....	459,522	.....	.....
Conanicut Mills	17,800	16,306	78,346	.....	.....
Cornell Mills	301,981	52,662	249,319	.....	.....
Davis Mills	327,544	309,977	352,727	.....	.....
Davol Mills	160,260	49,659	160,260	.....	.....
Durfee Mills	836,460	225,858	402,105	.....	.....
Fall River Iron Works Co.	1,021,217	355,735	3,211,023	.....	.....
Flint Mills	482,105	204,734	402,105	.....	.....
Foster Spinning Co. (Incorporated 1916)	.....	.....	197,422	20,572	.....
Granite Mills	436,371	217,497	423,034	.....	.....
Hargraves Mills	.....	.....	191,757	25,517	213,512
King Philip Mills	1,087,015	237,398	880,056	.....	.....
Laurel Lake Mills	224,822	115,540	224,822	.....	.....
Lincoln Mfg. Co.	162,080	.....	291,427	.....	.....
Luther Mfg. Co.	243,081	55,286	172,962	.....	.....
Mechanics Mills	371,982	67,477	168,212	.....	.....
Merchants Mfg. Co.	513,770	191,892	375,492	.....	.....
Narragansett Mills	55,135	.....	136,225	.....	.....
Osborn Mills	56,474	146,449	118,847	.....	.....
Parker Mills	1,605	.....	315,277	.....	.....
Pilgrim Mills	97,209	58,709	67,670	.....	.....
Pocasset Mfg. Co.	128,834	47,024	136,335	.....	.....
Richard Borden Mfg. Co.	390,739	.....	312,686	.....	.....
Sagamore Mfg. Co.	875,628	319,907	787,184	.....	.....
Seaconnet Mills	.....	.....	126,776	108,022	87,223
Shove Mills	120,787	.....	341,071	.....	.....
Stafford Mills	86,265	.....	464,134	.....	.....
Stevens Mfg. Co.	473,240	132,118	390,587	.....	.....
Tecumseh Mills	529,427	198,001	418,504	.....	.....
Troy C. & W. Mfg.	.....	.....	11,763	15,524	23,063
Union Cotton Mfg. Co.	664,305	191,969	260,247	.....	.....
Wampanoag Mills	.....	.....	272,815	79,184	132,352
Weetamoe Mills	147,791	119,422	222,791	.....	.....
Totals	11,206,490	3,807,797	14,125,559	828,606	731,155

Our Textile Machinery Export Trade

(*Continued from page* 108)

thing but cotton spinning and preparatory machinery, a few mills have installed looms and certain special machinery, such as winders, finishing, dyeing and bleaching machinery. There has been a considerable demand from abroad for woolen and worsted machinery, but domestic plants have been so busy on home business that few of these orders could be filled. However, exports of such machinery have been larger than ever before and have included a considerable number of second-hand machines; in fact, prices paid for second-hand machinery have frequently been as high as those at which new machinery would have been sold if available. Orders have been widely distributed; the Saco-Lowell Shops, for instance, booking orders from China, Japan, Korea, India, Indo-China, Brazil, Peru, Ecuador, Colombia, Spain, Sweden and Finland.

MAKING DEMAND PERMANENT

That it is hoped to establish some of this export business upon a permanent basis is evidenced by the systematic manner in which certain groups of firms have organized their export departments. For China, Andersen, Meyer & Co., well known as the agents in the Far East for the General Electric Co., have secured the agency for a number of textile machinery and allied firms. They represent Saco-Lowell Shops, Crompton & Knowles Loom Works, Universal Winding Co., Curtis & Marble Machine Co., American Moistening Co., Standard Mill Supply Co., U. S. Gutta Percha Paint Co., Dodge Sales Engineering Co., and Lockwood, Greene & Co. Louis Kampf is the engineer in charge of textile construction and equipment for this group of firms in China. Practically the same firms are represented in countries on the West coast of South America by W. R. Grace & Co. Most of the Japanese business has been placed through one or two large importing and banking houses, like Mitsui & Co. Saco-Lowell Shops are represented in Japan by their own expert. Gaston, Williams & Wigmore, the well known export house, represent another group of textile machinery builders, including the Whitin Machine Works, the G. M. Parks Co. and others. While it is hardly to be hoped that large permanent trade will be maintained in staple lines of textile machinery with European countries, there is every reason to believe that the business with China and South American countries, if not with Japan, will continue to expand.

One of the most interesting of the Chinese mills equipped throughout with American textile machinery is that of the Yu Yuen Textile Co., Ltd., Tientsien. This is a plant of 25,000 spindles running on 14's and 16's warp-twist skeins, spun from ordinary Chinese cotton and sold to the native trade in bundles for the hand loom weaving of coarse sheetings and drills. All of the buildings of this plant excepting the storehouses were designed by Lockwood, Greene & Co., and are of native construction; they consist of a one-story picker house, power house, two-story spinning mill and a group of warehouses for cotton and finished goods. It may be of interest to note that the native bricks for this plant were made on the ground and were laid without the usual footings directly on the hard clay soil. The timbers were of Oregon pine, shipped in the log, and whipsawed and hewed into shape by hand. All of the construction work was done in the Chinese way, the excavated dirt being removed in baskets, and heavy machinery being transported from the railroads and docks on hand trucks. The equipment of this plant is American throughout from boiler house to reeling room. The reels happen to be of Chinese make and are driven by hand power. The electric drive is used for all of the machinery and is generated by two Curtis steam turbines of the high pressure condensing type. The electric equipment was all furnished by the General Electric Co., individual drives being used on the pickers, group drives in the card room and four-frame drives for the spinning. The lighting is by 25 c.p. Mazda lamps on a 220 v. circuit. The interior of all rooms is painted with "Rice's Mill White." The textile equipment consists of 100 cards, 69 roving frames and 25,000 spindles, furnished by Saco-Lowell Shops.

SPINNING MILL (CENTER) PICKER HOUSE (RIGHT), YU YUEN TEXTILE CO., LTD.

SPINNING ROOM YU YUEN TEXTILE CO., LTD., TIENTSIN, CHINA

EQUIPMENT YU YUEN TEXTILE CO., LTD.

Water tube boilers, Babcock & Wilcox; chain grate stokers, Babcock & Wilcox; power pumps, Goulds Mfg. Co.; condensers, Wheeler Condenser & Engineering Co.; electric machinery, General Electric Co.; wiring, Standard Underground Cable Co.; shafting, Jones & Laughlin Steel Co.; paint, U. S. Gutta Percha Paint Co.; humidifiers, Ameri-

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can Moistening Co.; leather belting, Graton & Knight Mfg. Co.; Balata belting, R. & J. Dick; textile machinery, Saco-Lowell Shops; mill supplies, Standard Mill Supply Co.

HOU SUNG COTTON MILL

The first all-American mill is Shanghai, China, is that of the Hou Sung Cotton Mill Co., of which H. Y. Moh, a graduate of the University of Illinois, is the manager. He is an unusually enterprising Chinaman and an expert manufacturer, and this weaving and spinning mill represents the latest developments in mill construction and equipment. All of the buildings are of reinforced concrete construction and consist of a two-story spinning mill and a saw-tooth weave shed. It operates 16,000 spindles, spinning up to 40's weaving and hosiery yarns from American cotton. All of the spinning and preparatory machinery is furnished by Saco-Lowell Shops. The weave shed is equipped with 400 Crompton & Knowles looms for the production of sheetings, drills and napped goods. This plant will buy its electric power from the Shanghai Municipal Council and all of the machinery is driven by General Electric motors. The winding machinery was furnished by the Universal Winding Co., and the finishing machinery by the Curtis & Marble Machine Co. Like all modern mills in this country it is humidified, the American Moistening system being used. The balance of the equipment and supplies were furnished through Anderson, Meyer & Co., Ltd., by the same firms that equipped the Yu Yuen mill at Tientsien.

Considerable machinery has also been sold to established mills in China, one of the largest orders having been placed by the Heng Foong Cotton Manufacturing Co., Shanghai. C. C. Nieh, who was vice-chairman of the Chinese Industrial Commission which came to this country in the summer of 1916, is owner of the latter plant. A total of about 80,000 spindles with complementary equipment has been sold in China through Anderson, Meyer & Co., Ltd., by the Saco-Lowell Shops, and the other companies associated in this group.

REPRESENTATIVE IN CHINA

When the Chinese Industrial Commission returned to China it became evident that considerable textile machinery business might be obtained there if properly followed up and the Saco-Lowell Shops sent out J. Fred Havey for that purpose in the summer of 1916. No small part of the success that followed these preliminary efforts was due to Mr. Havey's campaign. He also spent considerable time in Japan and laid the foundations for a business that has been considerably larger thus far than that in China.

DAY AND NIGHT WORK

Most of the Chinese mills are operated night and day, including Sundays, the only stops being for the Chinese holidays and for such occasional emergency work as the overhauling of boilers. The operatives work in two shifts, and five to six times as many are required to man machinery as in this country. Their average wage is 6c. to 8c. in American money for a 12-hour day. Some idea of comparative production may be gained from the fact that one of the best mills turns off an average of 1.3 lbs. of 14's warp yarns per spindle each 24 hours, while a fair production on the same count in this country is 1.34 lbs. per spindle for a 10-hour day.

CHINESE MILL CONSTRUCTION. AT TOP—HEAVING COLUMNS, WHIPSAWING TIMBERS. AT BOTTOM—MOVING 8-TON STEAM TURBINE, EXCAVATING FOR AMERICAN MOISTENING CO. HUMIDIFIER PLANT

IN THE JAPANESE MARKET

In view of the fact that one English firm of machinery builders, through its Japanese agent, has been able to control about 80 per cent of the textile machinery business in that country, it can be seen that the problem of getting a foothold for American cotton machinery would have been extremely difficult at any other time. Under war conditions the Japanese manufacturers have had no alternative but to come to this country for new equipment. Of a total of about 200,000 spindles all but 50,000 spindles were furnished by Saco-Lowell Shops, and 40,000 spindles of the balance went to the H & B American Machine Co., presumably to complete orders originally taken by the English firm of Howard & Bullough. Practically all of this machinery went into existing plants, and not into new companies. The principal Japanese demand was for machinery to spin 32's to 42's from American cotton, there being a particularly large demand for machinery to spin 2-40's wet twist which has a large sale in Japan and China for the weaving of lawns, muslins and shirtings on hand looms. One of the largest single equipments sold to Japan was that of 30,000 spindles of Saco-Lowell machinery that went to the Mousselaine de Laine Spinning and Weaving Mills at Osaka. This equipment was installed in a new one-story building having a saw tooth roof. The Japanese have bought considerable winding and other special machinery in this country, including nappers. They have been eager to secure worsted machinery, but have been able to obtain little excepting second-hand equipment.

War Strategy Affected Textiles

(*Continued from page* 109)

tile industry set up demands for cloth in Britain alone even greater than the North of Ireland flax mills could meet. Other materials have been tried for making the wings of aeroplanes, but nothing better has been found to date than woven fabrics of one class and another. Of a piece with aeroplanes in their strategical use are dirigible airships, every one of which requires great yardages of the most perfectly spun and woven cotton. In the same class rank the observation balloons, and, although in the strict sense not one of these is an original creation of this war, every one has taken on unforeseen developments.

SILK AND WOOL CARTRIDGE OR SHELL

The policy of entrenchment put a premium on the use of artillery, heavy and numerous enough to make an enemy line untenable. The enormous multiplication of guns and shells made it impossible for England to rely upon her small production of silk noil cloth for cartridges. The bigger worsted industry had to be yoked to the task and, although silk cloths might be preferable for all purposes, their use is confined to making cordite containers for pieces of a certain caliber.

The development of guns with a capacity for the prodigal expenditure of ammunition could not take place without calling on the textile industry for unprecedented quantities of felt for cartridge wads.

CANVAS BUCKETS AND BANDOLIERS

It was position warfare that brought the bomb into prominence and made it for long periods the chief instrument of close fighting. No textiles enter into the structure of the bomb, but every bomber has his canvas bucket in which relays of hand grenades are carried in the advance. Small arm ammunition too, loaded into charger clips of five rounds each goes to the soldier in light cotton bandoliers. There is a charger in each of its ten pockets and the tape of the bandolier goes around the soldier's neck. Ammunition is distributed from the boxes with one-tenth the trouble, in accurate quantities and in a form ready for instant use, while the bandolier is of next to no weight in itself and is cheap enough to throw away after using.

COTTON WEBBING DISPLACES LEATHER

The web equipment which in British use has so largely replaced leather upon foreign service is 2/20s cotton, folded ten or twelve times, and woven in narrow looms into webs for belts and shoulder straps. It dates actually from 1908, and it is a similar fabric in essence to the wider cloth that is made for haversacks, packs, pouches and stretcher fabrics for ambulance use. There were not special looms enough for the work in England when the war began and the manufacture fell largely to the makers of tapestry carpets.

ENORMOUS QUANTITIES OF WAR TEXTILES

The departures from established precedent emphasize the necessity of a textile industry as one element in national preparedness, but after all the truth is most heavily underscored by the vast multiplication of customary needs. The facts are perhaps more evident in England than anywhere, for upon English mills has been thrust the main burden of work that might otherwise have been done in Belgium, France and Poland. It is a formidable task to supply clothing to one army when that army is as large as the British, and to cope with a part or all of the requirements of all the armies of the European Allies is a more staggering one. It is relatively easy to recapitulate the new textiles that the war has brought into use, but it would tax any one to name a textile article used in former wars that has not also been demanded in this one. All the old goods and then these newer ones have been required, and they have been wanted in such quantities as the world has never known. If there had been no novelties the production of the blankets, greatcoats, tunics and trousers cloth, puttees, cap cloth, shirtings, flannels, socks, pants, vests, mitts, knitted packets, mufflers and caps would have reminded every one that in war the ability to turn out goods beyond the limits of peace time programs, and to make up the disabilities of one's partners, is vital.

MILLS BECOME AIRPLANE FACTORIES

In peace the mills manufacture goods superfluous for war, but these same mills can be put on a war footing. England has seen the ploughshares beaten into swords by the conversion of carpet mills into blanket factories, and even into shops for the turning of shell-cases. Worsted, woolen, cotton, linen, juts and silk machinery have been turned into feeders of the army, and the process has not reached the end by any means. There are cotton mills in Lancashire that are not necessary to present trade requirements, and plants for aeroplane building are wanted. The mills are being surveyed and, from those judged suitable, the machinery will be taken out and wood-working and sail-sewing and mechanical construction will take the place of carding, spinning and weaving.

AN ANCIENT TRADE IN ENGLAND

Other wars and threats of war have prompted nations to seek to make their army cloths, as they make their battleships, at home wherever possible. The Japanese Ministry of War started the Senju Woolen Factory expressly for army clothing. The Chinese Government, a few years ago, came to an agreement with a new woolen company at Shanghai. The Turkish Government started woolen mills at three points to make its own khaki. The woolen mills at Cawnpur and elsewhere in India have regularly had army business as their primary work. The smaller states throughout most of the world, among them Roumania, Bulgaria and Serbia had sought to make themselves self-sufficing in textiles for their armies, but upon exceptional occasions the smaller and less developed countries had to import. For a very long time army woolens and cotton drills have been a considerable export from England. The business is probably much older, but as a voucher of a certain antiquity may be appended a minute of evidence taken in 1806, when a committee of the House of Commons was investigating the grievances of cloth finishers and sheermen:

"One of the Yorkshire masters who is a respectable magistrate in that country was called.

"An honorable member reminded him of the unfortunate circumstance which led to the loss of the Russian market; namely, that a Russian brigade, newly clothed with English cloth, happening to be exposed to a drenching shower, their coats shrunk into waistcoats."

Protection and Prosperity

(*Continued from page* 102)

would contend that enough of this article to meet consumption could ever be fabricated in any part of the Union.

But fortunately a wiser counsel prevailed. Madison, who followed Jefferson in the presidency, exerted great influence over the final decision. Though he expressed friendly sentiments toward a very free system of commerce, he de-

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clared that "duties laid on imported articles may have an effect which comes within the idea of national prudence." How prophetic those words! At the time of the Civil War it was the industrial strength of the North that saved the Union. To-day it is our ability to fabricate the vast cargoes of munitions, and the ships to carry them that stands between us and slavery. It is this ability of ours to meet the war's demands for material for offense and defense that prevents the ambitious plans of Germany from being realized, and thus saves the liberty of the world.

MUST PERPETUATE PROTECTIVE POLICY

It is fortunate for us and the world that our early Congresses heeded the advice of men who taught that it is "both politic and just that the fostering hand of the general government should extend to all those manufactures that tend to national utility." It is because of this providential industrial preparedness, the result of a century and a quarter of protection, that President Wilson, an apostle of free trade, has been able to make his country felt in the greatest crisis of the world.

The lesson should sink deeply into the minds of our people. If we can save our lives and our liberties only by a complete mobilization of men, money and material, we should realize the tremendous importance of a national policy that has enabled us to train the men, accumulate the money and fabricate the material.

A policy so advantageous to us in the past, so essential in the present, must be maintained in the future if the fruits of that hard won victory, which will be achieved by American men, American money and American material, are to be enjoyed.

War Testing (Walen)

(*Continued from page* 109)

result obtained usually includes the crimp plus some stretch of the yarn, and is subject to a large personal error. The method of intercepts gives only the crimp and may be used to calibrate mechanical crimp determinators.

The term "take-up" is not used in this connection, as it is ordinarily assumed that take-up is the difference in length between the length of the fabric and the length of the yarn from the spinning frame necessary to weave this length of fabric. There are some changes in the length of the yarn from the time it leaves the spinning frame to the time it is taken from the fabric and straightened which cannot be determined from the finished fabric.

An exact knowledge of crimp is necessary in proportioning the stretch of the warp and filling in order to make the fabric a more efficient resistor to uniformly distributed pressure. This condition exists in the ordinary automobile tire, and in some types of aircraft fabrics.

THICKNESS IS ALSO ELUSIVE

The thickness of a textile material is quite as elusive a proposition as is the length. The true thickness is taken to be that thickness when the measuring surfaces are in full contact with the material and exerting no pressure. For practical purposes it is sufficient to measure the material between surfaces of definite area and exerting a definite pressure.

TENSIBILITY PROPERTIES

The tensibility properties of a textile material are generally the most interesting and useful, in that they may be taken as a valuable index to the qualities of the material. These properties may be defined as to the behavior of the material when subjected to forces parallel to the center plane of the material and which produce an extension. They include the following: 1, tensile strength; 2, load-stretch ratios; 3, hysteresis, or come-back properties.

These three properties are determined by placing a strip of the material between the jaws of a testing machine and stressing the material either in constant increments of load or in constant increments of stretch. The latter is the usual American practice. The extensions are plotted autographically against the loads. The hysteresis properties are obtained by stressing the material to a certain load, and releasing the stress in the same manner in which it was applied. This procedure may be repeated, depending upon the use to which the fabric is to be put.

The value of the tensile strength is already recognized, but the load-stretch ratios and hysteresis properties are little known. In a great many cases a material is subjected to repeated stresses, and apparently there is no connection between the failure of the material and its tensile strength. The cause of such failure lies in the fact that the material has not the correct hysteresis properties, and there is a relation between failure under repeated stress and the area and position of the hysteresis loops.

The value of measurements of tensibility properties is clearly emphasized in the rational design of airplane wing coverings, cotton belting, sewing threads, tire fabrics, and many others. A thorough knowledge, and application, of tensibility properties would lead to less trouble in the weaving of fabrics.

COMPRESSIBILITY

The compressibility properties are determined in a manner very similar to that used for determining the tensibility properties, and are of great value. Take for example the design of a mattress, comfortable, or press felt: The properties of primary importance in all three of these are that they should return to their original position after having been subjected to pressure, and that they should be compressed not more than is necessary for comfort and good performance.

A shock absorbing felt should absorb a large amount of the energy expended in compressing it, thus the area of the hysteresis loop should be large. A piano felt should absorb but little of the energy of the impact else the tone of the piano be impaired. Such a felt should have a hysteresis loop of small area.

The above examples are cited to show the value and need for a thorough study of tensibility and compressibility properties of textile materials. The Bureau has already applied these principles to the design of airplane fabrics, and to some extent to the design of blankets.

RESISTANCE TO UNIFORM PRESSURE

The resistance of a material to uniformly distributed pressure is an important consideration in the design of cement bags, balloon fabrics and airplane fabrics. A valuable index to this property is obtained by subjecting a large sample firmly clamped in a circular or rectangular clamp to air pressure. The deflection of the material is plotted against the pressure, and the shape of the deflected surface determined. From these values the stresses in the material may be calculated. Obviously, the load stretch curves will have an important bearing on the stresses carried by the fabric, and consequently the resistance to uniformly distributed pressure.

TEARING RESISTANCE

The tearing resistance of a fabric is determined by measuring the amount of work necessary to start the tear, and the amount necessary to keep it running. The two most common methods are as follows:

1—To place a strip in the jaws of a testing machine, having one edge of the strip loose and the other tight. The jaws are then separated and a tear started by cutting a small slit at the tight edge.

2—A sample is gripped in the piece, and a small cut made at the center. The jaws are then separated at the usual speed.

The load necessary to tear the fabric is plotted against the length of the tear, and the area under this curve taken as a measure of the tear resistance.

The Bureau is experimenting on another method which may be designated as a shock tear. A small square is marked out inside the edges of a large piece held in clamps at the top and bottom. Three sides of the square are cut and the piece allowed to hang down. This is attached to a large weight. The upper clamp is attached to a spring balance which records the load transmitted by the tearing fabric. The fabric is caused to tear by dropping the weight.

The tearing resistance is a function of the strength of the individual yarns and the number being stressed. From this the tearing resistance of two fabrics can be compared fairly accurately by an examination of the weave structure and yarns.

MOISTURE ABSORPTION

The moisture absorbing properties of textile materials have not been given as careful consideration as is necessary, but it is hoped that this phase of textiles may be thoroughly investigated in the near future.

HEAT RETENTION

The factors governing the heat retaining properties of textile materials are little known, and, accordingly, heat conductivity measurements under conditions which may be taken to stimulate conditions of use have been undertaken with the view of constructing fabrics which have maximum heat retaining properties for a minimum weight.

It has been found that a wool blanket is no warmer than a similar cotton blanket, and that the warmth depends upon the method of fabricating and finishing the material.

The design of such fabrics as military clothing involves not only the heat-retaining properties, but the resistance of the material to the hard uses to which they are subjected. Many of the factors involved in the latter consideration are not at present measurable in the laboratory, and are arrived at only by service tests.

DETERIORATION

The deterioration of materials when subjected to weather, heat, and light form an important part of the work and much valuable information regarding the performance of fabrics has been obtained in this way.

As a general proposition, the weather exposure test is far more conclusive than any accelerated laboratory method, as the time factor is in many cases the most important.

MICROSCOPICAL

The plans are nearly completed at the Bureau for a systematic and thorough study of the characteristics of textile fibers under the microscope, and it is believed that much valuable information will be obtained and added to the somewhat meager and inexact knowledge of raw materials used in textile manufacturing. It is expected to carry along with the microscopy of the fibers, a thorough study of the physical and chemical properties of the raw materials and their effect on the finished material.

Council of National Defense (Lamm)

(*Continued from page* 110)

namely that he take oath, can a manufacturer hold his position as adviser.

In this connection it might be well to explain that the impression got abroad that, when a manufacturer or "highly qualified individual" became "a Government employe or expert adviser," he would be required to give up all of his business connections. Officials of the Council of National Defense deny that any such statement was ever made by them, but it certainly was spread broadcast. At the time of this writing, however, some of these expert advisers have given up all business connections, while others have not. These latter, however, before giving advice on any contract must take an oath to the effect, as already stated, that they have no interest in the contract involved.

The textile experts who are now advising officials of the War Industries Board and their divisions are doing so under Section 3 of the Food Act. Officials of the Council of National Defense state that the only possible way to cover the present situation is to have these oaths taken.

It is the contention of officials of the Council that the general basis of the war organization remains the same as that in force in the days of peace, and that the additionals are almost wholly supplementary.

ORGANIZATION AND FUNCTIONS

The Council was created by Congress in 1916. Following is Section 2 of the Army Appropriation Bill of that year, creating the body:

SEC. 2. That a Council of National Defense is hereby established, for the coordination of industries and resources for the national security and welfare, to consist of the Secretary of War, the Secretary of the Navy, the Secretary of the Interior, the Secretary of Agriculture, the Secretary of Commerce, and the Secretary of Labor.

That the Council of National Defense shall nominate to the President, and the President shall appoint, an advisory commission, consisting of not more than seven persons, each of whom shall have special knowledge of some industry, public utility, or the development of some natural resource, or be otherwise specially qualified, in the opinion of the council, for the performance of the duties hereinafter provided. The members of the advisory commission shall serve without compensation, but shall be allowed actual expenses of travel and subsistence when attending meetings of the commission or engaged in investigations pertaining to its activities. The advisory commission shall hold such meetings as shall be called by the council or be provided by the rules and regulations adopted by the council for the conduct of its work.

That it shall be the duty of the Council of National Defense to supervise and direct investigations and make recommendations to the President and the heads of executive departments as to the location of railroads with reference to the frontier of the United States so as to render possible expeditious concentration of troops and supplies to points of defense; the coordination of military, industrial, and commercial purposes in the location of extensive highways and branch lines of railroad; the utilization of waterways; the mobilization of military and naval resources for defense; the increase of domestic production of articles and materials essential to the support of armies and of the people during the interruption of foreign commerce; the development of seagoing transportation; data as to amounts, location, method and means

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of production, and availability of military supplies; the giving of information to producers and manufacturers as to the class of supplies needed by the military and other services of the Government, the requirements relating thereto, and the creation of relations which will render possible in time of need the immediate concentration and utilization of the resources of the Nation.

That the Council of National Defense shall adopt rules and regulations for the conduct of its work, which rules and regulations shall be subject to the approval of the President, and shall provide for the work of the Advisory Commission to the end that the special knowledge of such Commission may be developed by suitable investigation, research, and inquiry, and made available in conference and report for the use of the Council; and the Council may organize subordinate bodies for its assistance in special investigations, either by the employment of experts or by the creation of committees of specially qualified persons to serve without compensation, but to direct the investigations of experts so employed.

That the sum of $200,000, or so much thereof as may be necessary, is hereby appropriated, out of any money in the treasury not other wise appropriated, to be immediately available for experimental work and investigations undertaken by the Council, by the Advisory Commission, or subordinate bodies, for the employment of a director, expert and clerical expenses and supplies, and for the necessary expenses of members of the Advisory Commission or subordinate bodies going to and attending meetings of the Commission or subordinate bodies. Reports shall be submitted by all subordinate bodies and by the Advisory Commission to the Council, and from time to time the Council shall report to the President or to the heads of executive departments upon special inquiries or subjects appropriate thereto, and an annual report to the Congress shall be submitted through the President, including as full a statement of the activities of the Council and the agencies subordinate to it as is consistent with the public interest, including an itemized account of the expenditures made by the Council or authorized by it, in as full detail as the public interest will permit: *Provided, however,* That when deemed proper the President may authorize, in amounts stipulated by him, unvouchered expenditures and report the gross sums so authorized not itemized.

Congress had in mind in passing the act that the Council would mobilize the industries of the country and make easily available to the Government in time of need the services of the professional and industrial leaders of the nation.

"RUBBER STAMP" DECISIONS

It is the special contention of the officials of the Council of National Defense that the contracting agencies of the Government have not been supplanted by the Council, this statement seems to have been controverted by the Senate Committee on Military Affairs. Their investigation of War Department contracts has apparently shown that the Quartermaster General of the Army, General Sharp, was nothing but a "rubber stamp official," and that all he did was to actually sign the contracts, the work up to that point having been consummated by experts of the Council. However, the Council officials say that the final decision on contracts in every case rests with the Government officer responsible under statute for the disposition of his appropriation.

The present organization, in so far as it relates to contracts, may be described briefly as follows: The general supervisory direction of purchases, including the development of additional sources of supply, rests with the War Industries Board of the Council of National Defense, which has as its civilian chairman, Daniel Willard, president of the Baltimore & Ohio Railroad and chairman of the Advisory Commission of the Council. The other members of the War Industries Board are: Col. Palmer E. Pierce, representing the Army; Rear Admiral Frank F. Fletcher, representing the Navy; Robert S. Lovett, representing priorities; Bernard M. Baruch, representing raw materials; Robert S. Brookings, representing finished products; Hugh Frayne, representing labor, and Lieut. H. P. Bingham, as secretary. Lovett, Baruch and Brookings form an inner "purchasing committee," the first having charge of questions of priority, the second of raw materials, and the third of finished products. Each of the three has a supplementary organization under him composed of specialists in the various industrial fields covered by his branch of work. Judge Lovett is also, by appointment of the President, Administrator of the Priority Shipments Act.

CLEARANCE COMMITTEE CO-ORDINATES

In addition to the divisions of the War Industries Board already mentioned, one of its most important committees is the so-called Clearance Committee, which considers the placing of orders or contracts by the various government departments and bureaus, desiring to purchase materials designated in a list showing that a shortage exists or is imminent. The chairman of this committee is Capt. C. C. Bolton. Its duties are to consider the price and source of supply involved in cases of contemplated purchase involving limited amounts and to avoid any obvious conflict with the supply of the same material for any other department. It approves the placing of minor orders or contracts as recommended by the department concerned when fully satisfied of the propriety of the action desired. If matters of priority between the departments represented in the committee can be adjusted by the committee, it is so recommended by the Priorities Division. If matters of price cannot be approved unanimously, the matter is referred to the division concerned. It refers to the Raw Materials or Finished Products Division of the War Industries Board, as the case may be, such items of shortage as it discovers, to secure an increased supply of the item, or to develop a satisfactory substitute.

The functions of the War Industries Board are described best as those of a clearing-house for the war needs of the Government. It determines the best ways of meeting them, including recommending methods of increasing production, the extension of industries demanded by emergencies, the sequence and relative urgency of the needs of the different Government services, considers the prices, and in the first instance, the industrial and labor aspects of problems involved.

THE COMMERCIAL ECONOMY BOARD

One of the subordinate organizations of the Council whose policy has a direct bearing on commercial business, is the Commercial Economy Board of which A. W. Shaw is chairman. In spite of the large amount of publicity which has been given to the work of the board its functions are still apparently misunderstood. The work of the Commercial Economy Board is to secure through the co-operation of business houses and manufacturers economy in use of men and materials to aid in carrying on the war. Our readers are well aware that it has for many months been holding conferences with wool manufacturers, selling agents, cutters and distributors on the problem of wool conservation. The general purposes underlying the board's work is to assist the business men and manufacturers to conduct special phases of their work along more economical lines, permitting them to conduct their business with less men and equipment, thus enabling them more easily to meet the drain on man power which the war is expected to bring.

THE INDUSTRIAL SERVICE SECTION

In addition to the other organizations to meet special needs, and informal groups which have been organized for various government branches to take care of special labor work in their particular fields, the Council of National Defense has organized a section on Industrial Service, whose duties are announced as: first, to determine present and probable demand for labor in war industries; second, to determine in connection with the Priorities Committee of the War Industries Board the relative priorities of the labor demand; third, to arrange for the supplying of the demand through the Department of Labor or such other governmental or civilian agencies as can best meet the demand; and fourth, to determine the needs for dilution of labor, including the introduction of women into industry and recommend policies to be followed in regard thereto. The work has been put in charge of L. C. Marshall.

RELATION TO COUNCIL OF ITS DIVISIONS

The Council, consisting of the Secretary of War, as chairman, the Secretary of the Navy, Secretary of the Interior, Secretary of Agriculture, Secretary of Commerce, and Secretary of Labor, was created by Congress in the Act itself. Coming directly under the Council is the Advisory Commission, of which Daniel Willard is chairman, and whose members have already been named. The Commission was nominated by the Council and appointed by the President. Next in line of importance is the War Industries Board, whose members have also been named, which is appointed by the Council itself.

It may be mentioned here that there is no longer a Committee on Supplies. That part of the Council is now officially designated the Supplies Section, of which Julius Rosenwald is chief and Charles Eisenman is assistant chief. The members of the various sections of the Raw Materials and Finished Products Divisions are appointed by the War Industries Board on the recommendation of the chiefs of the divisions.

The actual purchase of material for the War Department is somewhat as follows: The Quartermaster-General decides that he is in need of more overcoat cloth or more overcoats. In theory he notifies the War Industries Board, who refers his communication to the section on Supplies, of which Rosenwald is the head. He, in turn, refers the matter to his expert adviser who is supposed to be in touch with the market and know where such an order can best be placed to get the quickest delivery. In actual practice, however, the Quartermaster-General refers the matter direct to the Committee on Supplies. The latter handles the contract up to the time of signing and then refers it to the Quartermaster-General for his signature.

Co-operative Committee (Marvin)

(*Continued from page* 110)

you have been selected to serve on the committee as above, and I sincerely hope that your participation in the work will prove of great help to your committee, to your industry, and to your country."

VALUABLE ADVICE NOT ALWAYS ACCEPTED

This was the beginning of a series of about twenty-five meetings and conferences of the full committee in New York or Washington. One of the first acts of the committee was to join in the recommendation of the Boston and Philadelphia wool trade that the entire stock of wool, tops and noils in the United States be taken over by the Government at values current on April 2, 1917. On April 11 the Committee on Supplies announced that it was not possible to accept the proposition. If the recommendation had been adopted, many millions of dollars would have been saved, for it would have been possible to provide the Government with superior fabrics at a lower price.

Revised specifications for the principal fabrics of both the army and the navy were carefully prepared by the Joint Committee in the spring of 1917, with a view to assuring the production of good cloths and at the same time to conserving the available wool supplies of the country. It was very earnestly urged by the committee that there should be no lowering of the standards thus established. And when later emergency purchases of inferior cloths were made by the authorities in Washington, the Joint Committee served formal notice that it could not be held responsible for these materials.

DIFFICULTIES FOR MANUFACTURERS

Meanwhile, increasing prices of materials and supplies and successive advances in the wages of labor made the production of standard cloths at the maximum prices recommended in connection with them a matter of intensifying difficulty for the manufacturers. When these maximum prices were first suggested they were based upon a maintenance of wool values which would have been possible if the country's wool supplies had been taken over by the Government. Nevertheless, the wool manufacturers met the situation in a frank and loyal spirit, and continued to undertake contracts even though the possible profits, which had been modest enough at the outset, were showing a constant tendency to decrease. Before our participation in the great war, the current needs of the army and navy were being met from perhaps a dozen or twenty mills which were habitual bidders. Most of the other 1,000 woolen and worsted mills of the United States had had no recent experience in the production of American military or naval fabrics. But, in response to the urging of the Joint Committee, the number of mills undertaking these Government cloths was quickly increased in the summer of 1917 to between 200 and 300, and on Dec. 1 it was disclosed by the monthly machinery canvass of the National Association of Wool Manufacturers that fully 40 per cent of the active machinery in the country was engaged on these national orders.

CHANGES IN STATUS OF COMMITTEE

When Colonel John P. Wood entered the national service with his regiment, the First Pennsylvania Cavalry, in the middle of July, he tendered his resignation of the chairmanship of the Joint Committee, and was succeeded by Nathaniel Stevens, who had been vice-chairman. A few weeks later Messrs. C. Brooks Stevens and Frederick R. Edington took up their duties as permanent technical advisers of the Committee on Supplies in Washington, a service in which they are now retained. In November the authorities of the Council of National Defense came to the conclusion that they would terminate

(*Continued on page* 195)

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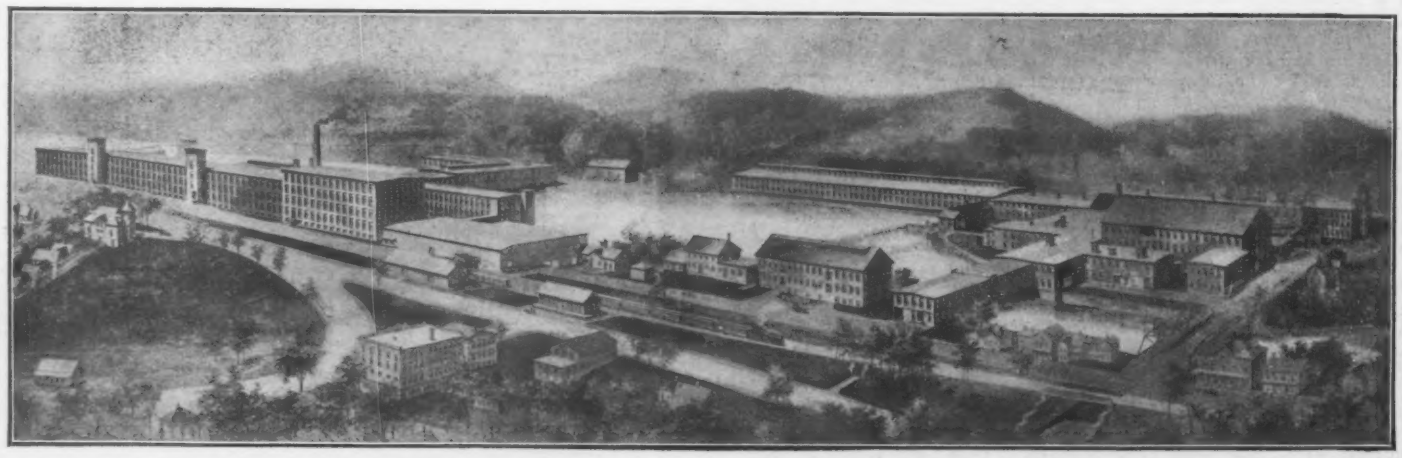

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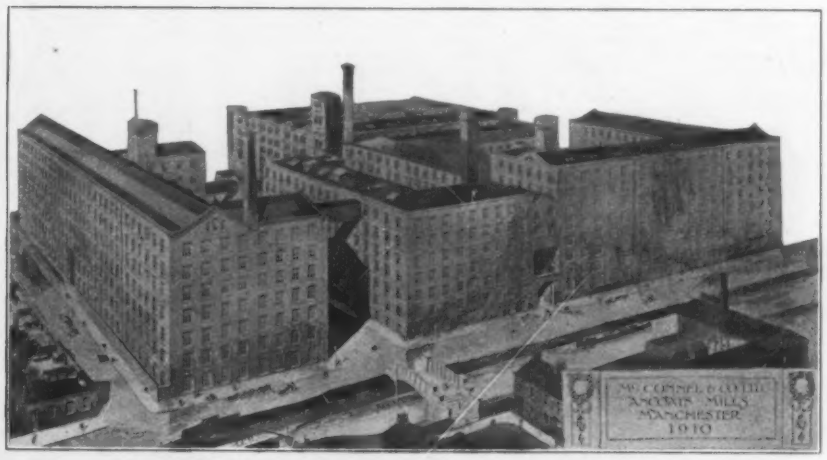

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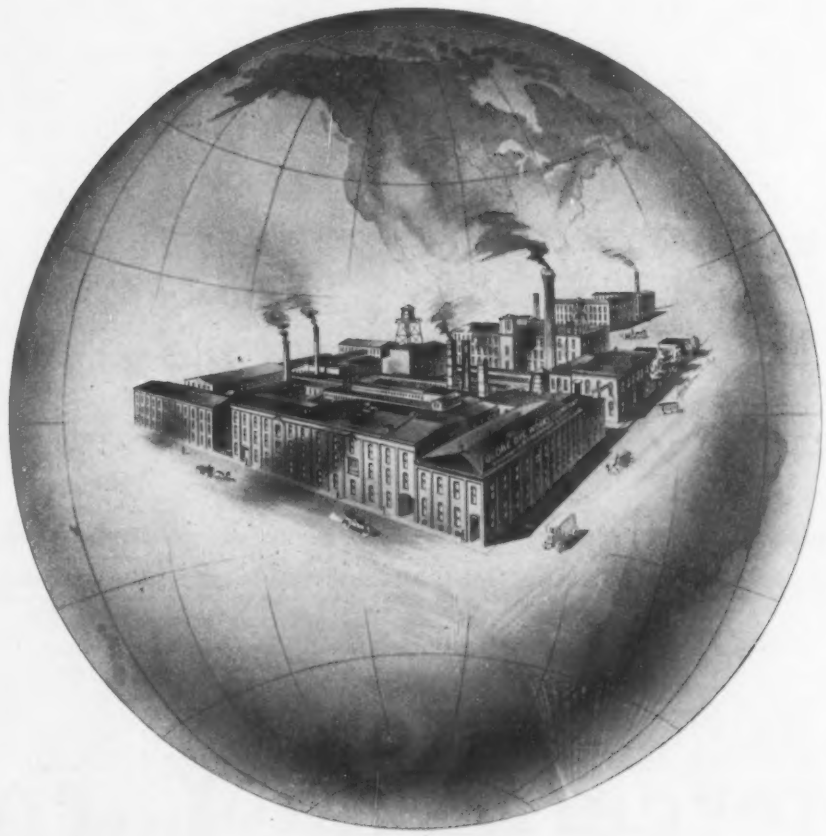

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Winding on Cones, Parallel Tubes, Cop Tubes and Beams

Capacity 50,000 Pounds Per Day

Superior Quality of Mercerizing. Highest Grade Dyes Used for Colors and Fast Black on Mercerized Yarns of Every Description

Clean and Bloomy **Fast Black** for Silk Goods—The Deep Blue Tone Desired

Silk Scroop given to Yarns when required without extra charge. Pure Bleaching for Piece Dye Work. Fancy colors dyed to match samples. Special Finish.

HOME BLEACH AND DYE WORKS

(INCORPORATED)

P. D. M'MANUS, Pres. and Treas. E. J. M'CAUGHEY, Vice-Pres. and Mgr.

Office and Works: PAWTUCKET, R. I.

Shipments Made from Providence ***Prompt Deliveries Guaranteed***

High Grade
Carded and Combed

COTTON YARNS

In all numbers, and
for all purposes

Richard A. Blythe, Inc.
308 Chestnut Street
PHILADELPHIA, PA.

T. J. PORTER & SONS
PHILADELPHIA

Representing Direct Large Spinners of
All Classes of Cotton, Woolen
Worsted, Mohair and Linen
Yarns and Threads
Imported and Domestic

Large Stocks Carried At All Times

We Specialize in the Better Grades and
Finer Numbers of Cotton Yarns

Representing:

Robert Marsland & Co., Ltd.
Manchester, England

Sir Titus Salt, Bart., Sons & Co., Ltd.
Saltaire, England

Lindsay Thompson & Co., Ltd.
Belfast, Ireland

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W. H. ARROTT, Pres. WM. ARROTT, Sec. and Treas
W. T. WESTERMAN, Manager

ONTARIO SPINNING COMPANY

Spinners of

High Grade Cotton
Underwear Yarns

All Sales Made Direct to Knitters

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Philip Street (above Columbia Avenue)
PHILADELPHIA, PA.

NATIONAL SILK DYEING CO.

Main Office, PATERSON, NEW JERSEY
Colt Bldg., 5 Colt Street
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Skein Silk Dyeing of every description for every class of textile manufacture.
Hosiery Dye—Boil-off, weighting and dyeing, treated especially to meet the requirements of the hosiery and knitting trade.
Piece Dyeing and Finishing—All silk and silk mixed goods.
Printing—Surface and warp printing.

WORKS:

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Allentown, Pa. Williamsport, Pa.

CLAUDE D. SMITH CO.

COTTON YARNS

COMBED—CARDED

CONES—TUBES—SKEINS—WARPS

GREENVILLE, SOUTH CAROLINA

FORREST BROTHERS

SOLE REPRESENTATIVES

VASS COTTON MILLS
BLADENBORO COTTON MILLS

Highest Quality
Extra Carded Hosiery and Underwear

5s-16s **YARNS** 20s-30s

Forrest Building, 119 South Fourth Street
Philadelphia, Pa.

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INCORPORATED

Temporarily located at 52 Vanderbilt Avenue.
After February 1st, 1918, permanently located at
NUMBER 1 MADISON AVENUE

COTTON YARNS

of all numbers and descriptions

SOLE SELLING AGENTS
for the
MANDEVILLE MILLS
CARROLLTON, GEORGIA

H. RAY PAIGE, *President*
J. A. MANDEVILLE, *Vice-President*
J. H. SCHOOLFIELD, *Secretary-Treasurer*

Cable Address: "Nuzum"

H. F. NUZUM

23-25 Beaver Street -- New York City

COTTON

SPECIALIZING IN EXTRA STAPLES
AND LOW GRADES FOR DOMESTIC
CONSUMPTION AND EXPORT

OF ALL GRADES AND
STAPLES FOR SPINNERS'
REQUIREMENTS

EUGEN C. ANDRES COMPANY

Cotton Merchants

Direct Importations from

Egypt, Peru, China, India and Brazil

American Uplands and Staples

Special Attention to Spinners' Requirements

HIGH GRADE COTTON WASTE

141 MILK STREET -:- BOSTON, MASSACHUSETTS

BRANCH OFFICES:

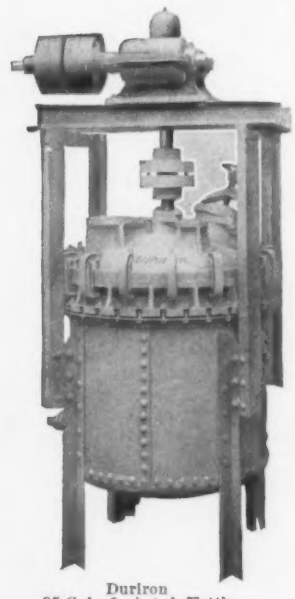
New Bedford, Mass.: 31 N. Water Street
Fall River: 205 Bank Street
Troy, N. Y.: Jackson and First Streets

DURIRON

(Acid-Alkali-Rust-Proof)

for

Bleaching and Dyeing



Duriron
35-Gal. Jacketed Kettle

We manufacture Valves, Cocks, Pipe and Fittings, Exhaust Fans, Jacketed Kettles, Pots, Towers, Jets, Condensors, Manifolds, Stirrers, Scrapers, Concentrating Apparatus, etc.

This very hard and durable alloy is being successfully used in the Textile industry, as Duriron is practically unaffected by most acids and alkalies. Neither is it affected by hypo-sulphites of lime and soda, etc.

Amongst numerous users of Duriron apparatus we mention, by permission,

American Thread Co.
Holeproof Hosiery Co.
Pacific Mills
Rosemont Dyeing Co. *and*
Springdale Finishing Co.

Duriron Kettles are made in numerous standard styles and sizes, plain or jacketed, without or with stirrers and drive for same. Special apparatus can be supplied to meet requirements. We can also furnish standard sizes and lengths of Duriron pipe, as well as pumps, valves and fittings for the circulation and control of liquid flow.

There is some process in practically every industry where Duriron will prove most advantageous. Let our engineering experts advise with you.

Send for sample of Duriron—make your own test.

Duriron Castings Company, Dayton Ohio

NEW YORK OFFICE: 90 WEST STREET

CHICAGO: OTIS BUILDING

2028

16 More Letters That Show You Where T

Anniston Yarn Mills

Annistons, Ala. August 29, 1917.

Valley Waste Mills,
LaGrange, Georgia.

Dear Sirs:-

We are in receipt of your check for $1,911.18 covering the last invoice of waste shipped you, for which we thank you.

We have been engaged in the cotton mill business for seventeen years and during this time have dealt with several waste dealers.. We unhesitatingly say that our dealings with you have been most satisfactory. It is a great relief to feel that no matter what course the market may take the contract will be faithfully carried out.

Yours very truly,
ANNISTON YARN MILLS
By J. T. Gardner Treas

JTG-b

OFFICE OF
THOMASTON COTTON MILLS.

THOMASTON, GA., August 31, 1917.

Valley Waste Mills,
LaGrange, Ga.

Gentlemen:-

We have sold you our entire production of Waste for the past two years and wish to state that our relations have been both profitable and pleasant. Knowing personally all of the officers of the Valley Waste Mills, we are confident of both their moral and financial responsibility and know that no matter what conditions might arise, that Waste bought by them will be taken up and paid for promptly and cheerfully.

In unprecedented times like we are having now, we feel that a mill of this caliber should be appreciated and would take pleasure in recommending you to any one contemplating selling their Waste.

Yours very truly,
Thomaston Cotton Mills.
By W. S. Brightower Treas.

EB/B

The Russell Manufacturing Co.

Alexander City, Ala. Aug. 28, 1917.

Mr. Cason J. Calloway, Manager,
Valley Waste Mills,
LaGrange, Ga.

Dear Mr. Calloway:-

We wish to express our satisfaction of the manner in which you have carried out your waste contract with us this year. We have found you fair and prompt in your payments regardless of whether the market was very high (going against you) or otherwise. It is always a pleasure to do business with a moral and strong financial concern such as you have shown yourselves to be with us.

With best wishes, we are,

Yours very truly,
The Russell Mfg. Co.
Maj. R. [illegible]
President.

Gate City Cotton Mills
High Grade Hosiery Yarns

ATLANTA, GA. Aug. 23,1917

Mr. Cason J. Calloway, Mgr.
La Grange, Ga.

Dear Sir:

Replying to your inquiry of the 22nd instant, beg to say that we have been selling our entire production of waste to the Valley Waste Mills at La Grange Ga. for the past several years. Their prices paid us for our waste was always equal to the highest quotation we would receive and in some instances a better price and their manner of conducting business is upon the highest planes and payments always promptly.

We shall be open for bids for our waste after Nov. 15th. next, and shall expect to continue business with you.

Yours very truly,
Gate City Cotton Mills,
By Samuel A Carter Pres't

C/H

COVINGTON MILLS
MANUFACTURERS OF
FINE SHEETING

COVINGTON, GA.,

Sept.5,1917.

Valley Waste Mills,
LaGrange,Ga.

Gentlemen:

Regarding Waste for 1918:

We have had business dealings with you practically since you began business and it is a great pleasure to testify to your thorough responsibility and fair and square methods. In all our business relations we have never had the slightest misunderstanding, and prices being equal it will still be our pleasure to continue business with you good people.

Very truly yours,
N. S. Turner
Pres. and Treas.

UNION COTTON MILLS
TEXTILE MANUFACTURERS

LA FAYETTE, GA. August 25th, 1917

Mr. Cason J. Calloway, Manager,
Valley Waste Mills,
La Grange, Ga.

Dear Sir:-

We have been contracting our waste to your mills since organized and we feel that you should hear how well satisfied we are. Our knowledge of the financial strength of Valley Waste Mills and our perfect confidence in the officers and management of your company gives us a feeling of security in placing our "Annual Waste Contract" with your good selves, for we know that whatever turn the cotton market may take our waste will be accepted and paid for at original contract price.

It is a pleasure for us to write these words of commendation and we hope same will be received in the spirit intended,

With high regards, we are,

Very truly yours,
UNION COTTON MILLS,
WAH-H By [illegible] Treasurer.

Modena Cotton Mills,
YARNS AND SHEETING

Gastonia, N. C. August 24, 1917

Mr. Cason J. Calloway,
Valley Waste Mills,
La Grange, Georgia.

Dear Mr. Calloway:-

I am just in receipt of your esteemed favor of August 22nd. and assure you that I have read it with a great deal of pleasure.

I wish to say to whom it may concern, that my relations with the Valley Waste Mills of La Grange, Georgia, have been exceedingly pleasant. One of the first things that impressed me in my dealings with these people, was their promptness in meeting their obligations, and an utter absence of that continual bickering that characterizes the dealings of some of the waste people over the country.

You have my permission to use this letter in any way that it will serve you.

Trusting that our pleasant relations may continue and with kindest personal regards, I remain,

Yours very truly,
J. A. White
President & General Manager.

WE PURCHASE EVERY GRADE OF WASTE THAT IS P

HILLSIDE COTTON MILLS, Owners C

VALLEY WASTE MILLS I

PRINT IN B

To Sell Your Waste With Security

QUOTATIONS SUBJECT TO CHANGE WITHOUT NOTICE

Swift Spinning Mills

Yarns

Columbus, Ga. Aug. 28, 1917.

Mr. Cason J. Calloway, Mgr.,
Valley Waste Mills,
La Grange, Ga.

Dear Mr. Calloway:-

We acknowledge receipt of your letter of the 22nd. and if at any time you are figuring with any one that contemplates selling you their out put of waste and they want any recommendations as to the moral and financial responsibility of your Company, which we believe to be unquestionable, we would be glad to have you refer them to us.

Knowing the Officiers of your mills personally, all of whom we have a very high regard for, we are confident that any one selling you waste could always count on your taking same regardless of the course of the market.

Our relations with your good Company have certainly always been very satisfactory and pleasant.

Yours truly,

SWIFT SPINNING MILLS.
V.-P. & GEN. MGR.

LMB.D.

A. J. EVANS
FORT VALLEY, GA.

Aug. 28th, 1917

Valley Waste Mills,
LaGrange, Ga.

Gentlemen;

replying to yours of 22nd I beg to advise it affords me much pleasure to state that for 1916 and 1917 we sold our entire output of waste from the Fort Valley Cotton Mills and the Fort Valley Knitting Mills(to your good company (Valley West Mills,at LaGrange) and I cannot commend too highly the manner in which you have handled this business. When we sell to the Valley Waste Mills we are assured that, no matter what market conditions are, they will accept the waste without any quibbling and same will be paid for promptly.

It is a great pleasure to do business with a concern with the integrity and calibre of the Valley Waste Mills.

Yours very truly

AJE/B

EXPOSITION COTTON MILLS

Manufacturers of SHEETINGS, SHIRTINGS, DRILLINGS & C.

August 30, 1917.

Valley Waste Mills
LaGrange, Ga.

Mr. Cason J. Calloway, Mgr.

Dear Sirs:

Please let us know as soon as you are ready to contract for our accumulation of cotton mill waste for the year 1918. Would also appreciate your opinion and advice as to the best time for us to make contract.

We have sold you our waste for the last three or four years, and our relations with you, at all times, have been most pleasant, and we want you to have our contract for next year.

Yours very truly,
EXPOSITION COTTON MILLS
President

A. G. THATCHER, President — ELDRIDGE McFARLAND, Vice-President — RICHARD C. THATCHER, Secy & Supt.
GEO. P. HASLAM, Treasurer — JOHN H. BARLOW, Asst. Supt.

COOSA MANUFACTURING COMPANY
COTTON YARNS

PIEDMONT ALA. August 28, 1917.

Valley Waste Mills.
LaGrange, Ga.

Gentlemen:-

We are very much pleased to note from your letter, Aug. 22nd, that you anticipate increasing your field of contracting for waste. We are now well into our second season contract with you for our entire out-put of waste. And will say, that we never had more pleasant connection in all our past 25 years of experience. We have had very little complaint from you, but where there was a complaint, upon investigation, generally found there was just cause for same, and it was an easy matter to remedy any difficulty, on the other hand, you have on one or two occasions called our attention to errors in our favor, this courtesy we very much appreciate.

We have always received prompt payment for shipments when due, and our business relations otherwise, have been entirely satisfactory, therefore, we trust that we will be able to get together again on next year's contract as we have for the past two years.

Yours very truly,
COOSA MFG. CO.

GPH.NF

Geo. P. Haslam
TREAS.

Chadwick-Hoskins Company
MANUFACTURERS OF
COTTON GOODS
Charlotte, N.C.

August 29th, 1917

Valley Waste Mills,
La Grange, Ga.

Gentlemen:

We take pleasure in stating that we have had very pleasant dealings with your Company during all of last year, and up to the present in this year in all of our transactions covering waste. We would be glad to write anyone you suggest, stating that we are very much pleased with our relations with your company, both as to moral and financial responsibility.

Yours truly,

ECD-G

E C Dowell
Secretary.

MOULTRIE COTTON MILLS
Moultrie, Ga.

Sept. 3, 1917

Valley Waste Mills,
Mr. Cason J. Calloway, Mgr.,
LaGrange, Ga.

Gentlemen:

From the time your mills commenced operation, this mill, as well as the Poulan Cotton Mills, Poulan, Ga., of which the writer is president, has contracted and shipped our waste production. It is a privilege to be able to say to you that our relations and dealings covering the entire period have been most satisfactory.

For a number of years, the mills of the South have needed a strong and reliable waste mill, both morally and financially; a company that will take care of their contracts and protect their mills regardless of price. In abnormal times, such as we have at present, it is certainly wise for cotton mills to only contract with concern that are financially and morally responsible. Knowing the high standing of all of your officers, as well as the strong financial ability of your company, we think it distinctly to the advantage of all southern mills to be able to make contracts with a company such as the Valley Waste Mills.

Yours very truly,

ejv/o

Crown Cotton Mills
ESTABLISHED 1894
Dalton, Ga.

August 31.1917

Mr.Cason J.Calloway,Manager,
Valley Waste Mills,
La Grange, Ga.

Dear Mr.Calloway:

I want to thank you for the way you have carried out our waste contract for this year. Every detail has been satisfactory to us.

No little part of the pleasure that we have had in this contract is derived from the feeling of security in the knowledge that no matter what the fluctuations in market may be--your contract is absolutely good. That should waste decline from the present high levels,payments would continue at contract prices without a single claim.

Yours very truly.

Edw. Hamilton Gault

J. W. CANNON, PRESIDENT.

CANNON MANUFACTURING COMPANY, CONCORD, N.C. — PATTERSON MANUFACTURING CO., CHINA GROVE, N.C.
CANNON MANUFACTURING COMPANY, KANNAPOLIS, N.C. — PATTERSON MANUFACTURING CO., KANNAPOLIS, N.C.
GIBSON MANUFACTURING COMPANY, CONCORD, N.C. — KESLER MANUFACTURING COMPANY, SALISBURY, N.C.
CABARRUS COTTON MILLS, CONCORD, N.C. — MOORESETT MILLS COMPANY, KANNAPOLIS, N.C.
FRANKLIN COTTON MILLS, CONCORD, N.C. — EFIRD MANUFACTURING COMPANY, ALBEMARLE, N.C.
TUSCARORA COTTON MILLS, MT. PLEASANT, N.C. — IMPERIAL COTTON MILLS, KINSTON, N.C.
AMAZON COTTON MILLS, THOMASVILLE, N.C.

CONCORD, N.C., August 27, 1917

Mr. Cason J. Calloway, Mgr.,
Valley Waste Mills,
LaGrange, Ga.

My dear Mr. Calloway:-

We have been selling you waste for the past three years and your settlements have been entirely satisfactory. In fact, we did not consider that they would be any other way, knowing the firm we are dealing with, and we hope to be able to come together on waste, so long as we are in the manufacturing business, as we know you to be strong morally and financially, able to carry out any contract that you make.

Very truly yours,

James M Cannon

FLINT RIVER COTTON MILLS
F. P. PUTNEY, President
MANUFACTURERS OF
SHEETINGS
Albany, Ga. September 3rd. 1917.

RECEIVED SEP 6 1917

Valley Waste Mills,
LaGrange, Ga.,

Dear Sirs:

Our contract for waste with you this year has been most pleasant in every way and we would be glad to recommend you to any one you wish to contract with.

On account of the unsettled conditions this year and the fact that a large percent of the waste is sold on a flat price, we feel that it behooves all mills to sell to as strong a concern as possible,and, therefore, think you should have no trouble in purchasing all the waste you wish this fall.

However, if we can aid you in the above, we will be glad to do so.

Yours very truly.

Flint River Cotton Mills.

Sec. & Treas.

T IS PRODUCED IN A COTTON MILL
wners CASON J. CALLAWAY, Asst. Treas. and Mgr.
L S LaGRANGE, GA.
PRINT IN BINDING

TOLH

Tolhurst Self-Balancing Hydro-Extractor

Self-Balancing not only in name, but in actual operation. The flexible bearings give maximum service with minimum maintenance.

All Tolhurst Extractors are equipped with Patent Adjustable Idlers which permit engine, motor or countershaft drive—floor or ceiling.

ESTABLISHED 1852

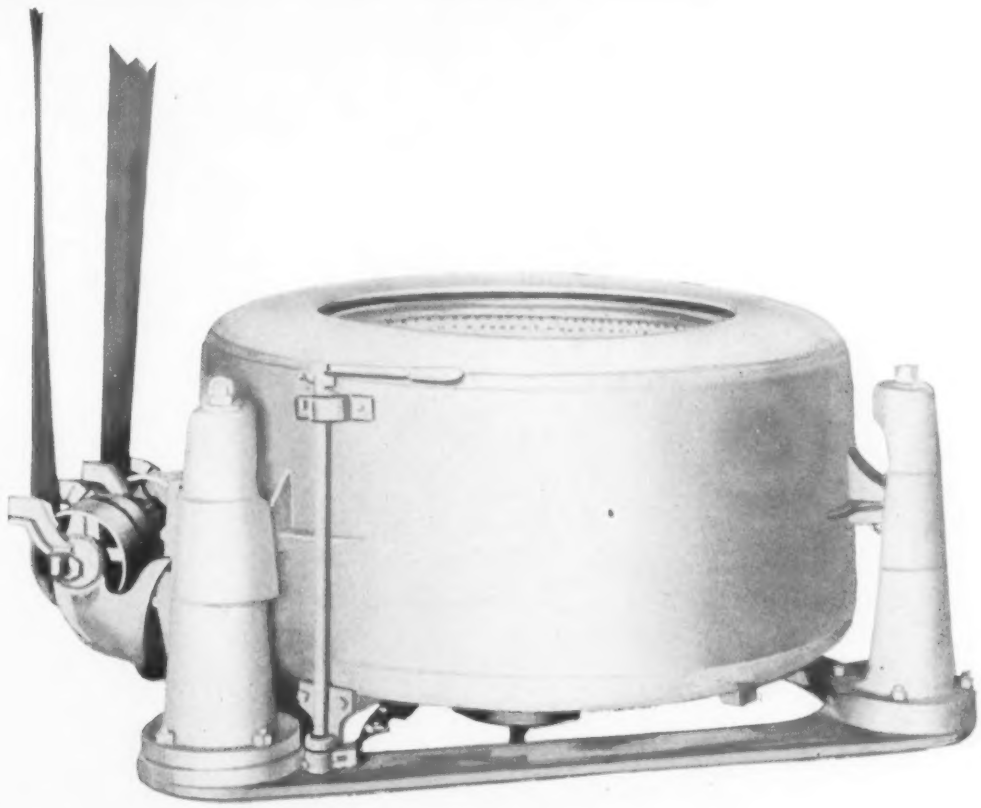
TOLHURST

SOUTHERN REPRESENTATIVE
Fred. H. White,
Realty Bldg.,
Charlotte, N. C.

NEW YORK REPRESENTATIVE
Fred. A. Tolhurst,
111 Broadway
New York

EXTRA

URST



Tolhurst Link Type Hydro-Extractor

The *Center Sling* case is a new (patent allowed) feature which eliminates the many difficulties formerly encountered in oscillating case Extractors.

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OVER A HALF CENTURY'S EXPERIENCE

During sixty-five years devoted to the perfection of Tolhurst Extractors, no trouble or expense have been spared to make them the most durable and economical Extractors on the market.

MACHINE WORKS TROY, N. Y.

WESTERN REPRESENTATIVE
John S. Gage,
Hartford Bldg.,
Chicago, Ill.

CANADIAN REPRESENTATIVE
W. J. Westaway,
Sun Life Bldg.,
Hamilton, Ont.

CTORS

We have developed new products at our Newark Plant particularly suited for dyeing

Government
OLIVE DRAB

To Mills that do their own mixing, we shall gladly supply the component colors.

For mills that do not do their own mixing, we have standardized the mixture

Khaki B

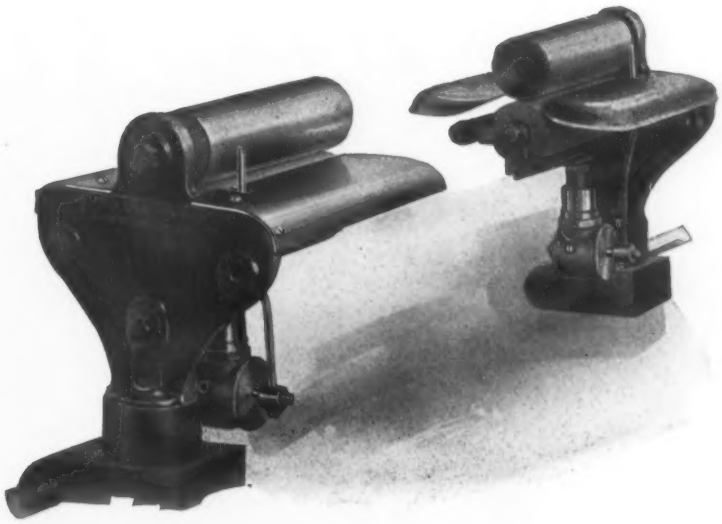
We shall be glad to match any particular shades, and make mixtures for same or furnish formulae

Inquiries Solicited

Marden, Orth & Hastings Corporation
(Established 1837)

61 Broadway, New York City

Boston, 225 Purchase St.
Philadelphia, Widener Bldg.
Cleveland, Rockefeller Bldg.
130 N. Fifth Ave., Chicago
Hoge Bldg., Seattle
316 Clay St., San Francisco



Have you any kind of fabric that has to be fed to a roll or machine?

We are constantly discovering new uses for the "Foxwell" Pneumatic Guider and Feeder. Perhaps we can adapt it to your special requirements?

Catalog on request

THE BUTTERWORTH LINE INCLUDES:

Bleaching Machines	Mercerizing Ranges	Soaping Machines	Calenders (all kinds)
Drying Machines	Hydraulic Presses	Tentering Machines	Color Kettles
Singeing Machines	Dyeing Machines	Mangles (all kinds)	

H. W. BUTTERWORTH & SONS CO.

ESTABLISHED 1820

Providence Office, Turk's Head Building PHILADELPHIA

FINISHING
Butterworth
MACHINERY

80

The Provider

The Textile Mills of America are supplying the needs, not only of our own armies and people, but also those of our allies to a great extent. In the country's largest mills Klauder-Weldon Dyeing, Bleaching and Scouring Machines are "doing their bit" to meet this colossal demand.

The Leaders, Pioneers and Originators in this field of machinery construction point the way to greater efficiency in production and quality.

Now is the time to bring your production to the highest state of efficiency. Delays are costly. Write now for literature.

KLAUDER-WELDON DYEING MACHINE CO.

YARDLEY, PA., U. S. A.

PROVIDENCE OFFICE: Case Mead Bldg. FOREIGN PLANT: Huddersfield, England

CANADIAN OFFICE: 5 Sun Life Bldg., Hamilton, Canada

Present Status of Dyes and Dyeing in This Country

Americanization of the Entire Industry Proceeding Rapidly with Encouraging Results

DURING the year 1917 there has been nothing distinctively new either in the manufacture of coloring matters, or in the applications of these colors to various fabrics. Emphasis has been placed on increasing the number of colors available from the intermediates produced, speeding up the production of intermediates and colors and laying plans for the manufacture during the present year of synthetic indigo, some type of vat dye and possibly of alizarine colors.

At the present time splendid range of American-made colors is available—basic, direct and sulphur colors for cotton and acid and chrome colors for wool. That there is no reason now to complain of any scarcity of coloring matters is shown conclusively by the fact that during the month of September we exported aniline dyes to the amount of $371,565. For the first quarter of the fiscal year ending Sept. 30, aniline dyes, valued at $1,173,439, were exported. The entire domestic production of aniline dyes for the fiscal year of 1914 was valued at $2,470,096, which means approximately that we are now exporting in six months surplus dyes—chiefly to England and her colonies—equal in value to our entire yearly production before the war.

BRIGHTER AND MILITARY COLORS ADDED

When the American dyestuff industry was first thrown upon its own resources the two divisions of natural and artificial colors concentrated their efforts on meeting the call for blacks and blues, which together comprise, say, 75 per cent. of total dyeing operations. The year just closed has been marked by the appearance in quantity of the brighter colors, and since we ourselves entered the war effort has been diverted more especially to the production of colors suitable to meeting the demands for military and naval fabrics.

The shock incident to our entering the war was met and absorbed. Strong confidence in the future of the industry manifested itself. Consolidation took place, and larger plans were projected for creating and holding permanently against all after-war competition a self-contained dye industry.

THE GERMAN PROPAGANDA

It seems now hardly open to question that for years before the war a skilful propaganda was being carried on in this country with the object of capturing the dyestuff industry, by reducing the dyer to a mere dependent upon German laboratories. The art of this propaganda was not understood because, under the guise of supplying full information, the dyer was being insiduously robbed of his independence of judgment, and his training and experience were being undermined by promised ease of guaranteed results.

Everybody knows how thoroughly the German dyestuff concerns supplied extremely attractive color cards. All a dyer had to do was consult the formula given, buy the dyestuff recommended, and if he needed assistance German expert advice was his for the asking. There was a gradual shifting of the self-reliance of the American dyer to the German employed chemist. All this Kulturization of the dyer was for a purpose, and that purpose was to tie up the textile industries of this country through its dyers, to Germany.

One result of this German domination of the American dyer was the unnecessary and consequently wasteful multiplication of coloring matters. There was a color for every tone and tint required. This was a snap for the dyer—as Germany foresaw—but it led to the buying of a larger amount of dyestuffs than was necessary. The outbreak of war found dust-covered cans of all kinds of dyestuffs in a great many dye houses. Germany intended to sap the confidence of the dyer to produce his own shades, and at the same time convert all available material—some of which under a restricted production of shades and color, would probably have been by-products—into salable dyestuffs.

Since the war, the American dyer has been thrown upon his own resources. He has come from under this dangerous tutelage, and it has to be admitted that he has made very good under most difficult conditions. Watered, salted anilines and natural dyestuffs of uncertain and unreliable characteristics have not proved an insuperable barrier to his ability to come back and produce the goods. And now to everybody's satisfaction, things all round are a little easier.

But in all this, there is guidance for the future. Compared with German organizations, American concerns emphasize, at the expense of the technical, the selling side of the organization. Germany does not do this. Her laboratories sell for her; not the drummer so much as the chemist was the essential basis, which underlay her broad and skilful policy of Kulturizing the color users in all lines in the United States.

It really seems worth while making as far as possible, a clean break with the German past. Hitherto we have had but one object in view and that of imitating the German processes and making in America, German dyes. But is there nothing better ahead? Has Germany so exhausted the field of organic synthesis that henceforth we may expect no distinctively American achievements in this field?

In addition to tying up the dyers of the country to German formulas and dyestuffs, another side of the Teutonic propaganda was overlooked. Those concerns immediately affected, noticed the pressure, but the textile industry as a whole, was unconscious of the fact that the other half of the German policy was to drive out of the field as far as it could be done, the wood extract colors produced in this country, and by our neighbors in the South. The attack centered on the production of black, both on cotton and wool, and all kinds of black dyes were offered and all kinds of arguments were advanced to convince the textile user that hematine black belonged to the things superceded by scientific achievement.

DYES NOW AVAILABLE

Referring to imports of the year our Allies have had too many uses for their own products to help us to any considerable degree. Switzerland, however, has been of great value to the Allies in helping out on the dyestuff situation. Fairly large quautities of synthetic indigo and vat dyes in blue and violet, also high-grade sulphur blacks have been imported. The high price of the vat colors has militated against their general use. A violet vat dye, 100 per cent. strength, is quoted at $40 a pound, and the blue at $17 per pound. Imported synthetic indigo, 20 per cent. strength, is selling around $1.50 a pound. An imported auramine at $5 is available and the manufacture of this color is now being carried on by a domestic concern. This color, most valuable for tinting purposes of paper makers, displaces the chrome yellow pastes which being insoluble and of little tinctorial value, required the use of a considerable quantity.

The silk dyers, who are large users of logwood extract, have had no trouble in getting a full supply of this commodity. Special water soluble colors are in the market including a nigrosine which can be modified to give either violet blue or black.

Cotton dyers have had throughout the year a fairly good supply of indigo, both natural and synthetic, and what is even more remarkable the original stocks of indanthrenes, cibas and hydrons have not yet been exhausted. The skilful use of these original vat dyes has so far enabled cotton dyers to meet, in part, the call for fast colors. It is estimated that the consumption of these colors is about one-tenth normal. The difficulty has been met, in part, by rearrangement of designs, substituting lines for stripes, and so having a much larger portion of a fabric unprinted or undyed. But as a general thing cotton dyers and printers are not inclined to compete for fast colors; they are already paying enough for help and chemicals generally. The public educated to demand fast colors has modified its demands considerably and dyers and printers are willing enough to follow the line of least resistance and do their best with what they have until a better day comes.

OPERATIONS IN DYEHOUSES

In one dyehouse where fast shades are produced it was found that they had still some quantity of German indanthrene blue and that they could also at the present time purchase small lots, around $37 a pound. Small quantities of a very fast pink were procurable at $140. They were, however, dyeing a fast pink, an imported English color, which met all the tests for corset cloths. Such vat dyes as were obtainable were being used for towelings, high-grade shirtings and bright cotton yarns for men's wear worsteds. A fast brown on 2-26s was being dyed a sulphur color with after treatment for army shoe laces.

Cotton dyers accustomed to use bright vat dyes have substituted direct colors and also basic dyestuffs put on a tannic acid and tartar emetic bottom.

PRODUCTION OF GOVERNMENT COLORS

The greatest interest, of course, centers around the production and manipulation of colors suitable for Government use in both wool and cotton. High-grade sulphur blacks, browns, blues, greens and yellows are obtainable to meet all demands for khaki on cotton. And for the O. D. shade on woolen goods browns and yellows are offered in large quantities and in great variety. Such colors for wool may be used on chrome bottoms or dyed in an acid bath and top chromed about ½ per cent. bichrome being sufficient or the shade may be produced by the mono-chrome method in which the coloring matters, bichrome and acetate or sulphate of ammonia are used in the one bath.

The method used in any given mill seems to depend on experience or predilection of the dyer. The bottom chrome method, however, is generally used in dyeing mixtures of wool and shoddies and in the converting of light rags to an O. D. shade. For the top chrome method it is claimed that the fabrics stand up better under fulling, but are no faster to light.

In one mill visited 2-24s worsted yarns on jack spools were being dyed by the mono-chrome method. The yarns are transferred from the mill spool to the special perforated spool adapted to the machine and after dyeing and drying are rewound on original spool and returned to the manufacturer. Prior to being dyed these yarns were scoured for thirty minutes in a weak ammonia solution at 130° F.; then dyed up in the mono-chrome bath, one hour being consumed before boiling point was reached. This mill also had some original vat dyes in stock. Blacks and blues were also being dyed in the same mechanical contrivance.

SULPHUR COLORS ON WOOL

Regarding the utilization of sulphur colors for wool dyeing, while the proposition is strictly not a war measure, nevertheless at a time when wool colors were much less abundant than now, it was regarded a possible way of easing up the dye situation and English patents were granted covering this project. The problem was really more complex than appeared on the surface. The strongly alkaline solution of a sulphur color at a high temperature would virtually destroy a woolen fabric. The line of experimentation therefore proceeded in the direction of neutralizing the excessive alkali to a point where it would be sufficient to keep the color in solution and yet not alkaline enough to injure the wool; and coincident with this neutralization the color had to be kept in a reduced condition. At this point it was found that the dyestuff had but little affinity for the wool, while its affinity for the cotton had been lessened.

A practical application of this method was attempted in union dyeing. In cashmere hosiery where the toe and heel were white wool and the body a mixture of black shoddy and cotton partial success was obtained in dyeing the cotton and still leaving the toe and heel white. Very little is being done at the present time on this process, and the general opinion is that sulphur colors are too harsh for wool, and that in view of the assured production of wool colors such a process, even if perfected, is unnecessary.

APPLICATION OF NATURAL DYESTUFFS

While much has been said regarding the development of the aniline colors the makers of natural dyestuffs have been equally patriotic in meeting the situation by extending largely their facilities and factories and continuing experimentation in the refining and perfecting of their products. The demand for these dyestuffs was very great at the commencement of the world war, but the supply has more than met the demand and in September, 1917, extract dyestuffs valued at $288,279 were exported. The line of extract colors is much larger than commonly believed and by the action of suitable mordants many good, bright, fast shades are procurable. The following natural coloring matters are available for either cotton or wool—logwood extracts in varying degrees of oxidation or fully oxidized as hematin for blacks and blues; quercitron, fustic in red and yellow shades and osage orange for yellows; Brazil and Lima wood extracts for reds; cutch and gambier for browns. If mordanting conditions are fully met a great variety

of shades both on wool and cotton are obtainable. But it must be recognized that on the whole greater skill is called for in the use of natural dyestuffs, than where anilines are used.

Prior to the outbreak of the war chronium had little place in the cotton dyehouse as a base for blacks. In the form of bichrome it was used in the production of cutch browns and lead yellow and oranges. Why chromium oxide will give a deep black on wool and only a slaty shade on cotton when both are dyed up with logwood seems difficult to understand. The explanation perhaps lies concealed in the fact that the cellulose of cotton has no such power as is possessed by wool to decompose and absorb the hydrated oxides of metals such as chromium, aluminum and iron.

Chromium in the form of an acetate had a use in the printing of cotton goods chiefly, however, in the line of olives and kindred shades formed by the use of Persian berries and quercitron in conjunction with a small quantity of aniline color. These shades were developed and fastened by steaming.

Attempts were therefore made to compound some mode of chromium salt that should be sufficiently stable under normal conditions but which would under the influence of heat deposit itself securely within the interstices of the cotton thread. This was accomplished and a continuous process established of dyeing a line of drabs, slates, olives and khakis. The cloth passes through a padding machine, a washing machine and a dyeing machine and is delivered dryed and ready for finishing.

Up to the present no practical methods have been made public regarding the use of natural dyestuffs in a single bath process. It is true that the last generation of dyers did occasionally produce certain medium shades by adding all the materials to the dye kettle at one time. Blacks could be obtained by this method both on cotton and wool. Superior fast colors were not, however, obtainable. The natural dyestuff makers are still engaged on this proposition, but the talk of converting dyestuffs like logwood and fustic, for example, into vat colors is based upon a misapprehension as to the behavior of these bodies. Without raising the question as to its source a distinquishing characteristic of a vat color is its property of being reduced, that is, being deoxidized and in this condition applied to the fiber. On exposure to the atmosphere, oxidation takes place, the color being restored and at the same time being fixed on the fiber. Indigo is the type example of a vat dye. The indigo vat in its reduced condition has an olive green hue. The goods rapidly become blue on the removal from the liquid.

However, this is not the whole story. The coloring principle of logwood hematoxylin may be regarded, for purposes of experiment, as an organic intermediate from which possibly, or probably, various colors may be built up by the substitution and additive methods similar to those used in synthesizing the artificial dyestuffs. Considerable research has been undertaken by large extract makers, and it is understood experiments are still proceeding. With hematoxylin as a base several colors have been produced which compare favorably in tinctorial power with the anilines.

But from another viewpoint the chief reason why the wood dyestuffs cannot apparently be reconstructed as vat dyes lies in the fact that logwood black or blue or fustic brown or yellow, are composed of lakes, formed through the union of the coloring principle of the wood with a metallic oxide. This operation, technically considered, is the formation of a larger molecule, not the reduction and consequent reoxidation of a color molecule already complete.

It seems, however, quite within the realm of possibility that soluble combinations of such dyewoods and bases may be evolved which, normally stable, will under conditions of temperature and possible electrical influences deposit slowly a fast color lake within the fabric. But all research on this problem will, so it would seem, have to take into account the essential difference of structure and property between cotton and wool.

In another direction also research is being pushed to refine and purify coloring matters produced by nature so that purer and brighter shades may be achieved. Nature produces very few things in the pure state. Coloring principles are found associated if not combined with glucosides and tannins. The presence of these bodies operates against clear shades. Tannin principles act as a resist in wool dyeing, but are not objectionable on cotton when iron is the base. The goal of the investigation in this domain is to obtain pure blue shades from logwood and pure yellow shades from fustic, and, if possible, clear pinks and reds from barwood, camwood and other red woods. If this can be done and at the same time a greater fastness to light be secured new uses will be opened up for such colors and they may, on account of the general superiority of wood colors in fulling operations, compete successfully with aniline dyestuffs.

In one other direction results may be anticipated. The manufacture of coloring matters, especially those derived from coal tar, is strictly a scientific process; but the application of these colors to the various fibers, especially the wood dyestuffs has been somewhat empirical. The idea of definite proportions does not seem to have taken root in the dyehouse. Theoretically there must be some specific combining weight existing between, say, chromium oxide and hematin, so that exact proportions of the two bodies would give the most stable black. Excess of either the base or the coloring principle from this viewpoint would not merely be waste but cause an instability of the color molecule. If three woolen dyehouses, for example, are obtaining blacks on the same class of goods, with 10 per cent of hematin crystals and yet the amount of bichrome used in the mordanting ranges from 1½ to 3½ per cent, one dyehouse is producing a superior black. But which one?

OUTLOOK FOR FUTURE

It is now quite well understood that artificial dyestuffs and high explosives require the same organic intermediates for their production. Prior to the war these intermediates, as also the dyestuffs built up from them, were largely imported. There was practically nothing in the country upon which to commence on the ground floor a self-contained dyestuff industry.

Great advances have been made in the production and collection of the various distillates. It would seem, however, that the demand of war for explosives having the first place this demand would tend more and more to outstrip the production of these bodies. As a case in point, toluol may be mentioned. This body is at present a constituent in illuminating gas, which contains about six ounces per thousand cubic feet; if the toluol should be recovered at the various gas plants of the country, it is calculated that eleven million gallons would be produced yearly. As against this it has been estimated that the requirements of the United States Field Artillery up to June, 1918, would consume twenty-two million gallons. With the world at war, increasing pressure will be put on the production of this necessary material from all sources; and if the dyestuff industry should, by any blunder at Washington, be classed as non-essential to the prosecution of the war, the present development of that industry would be brought to a sudden halt.

But when peace comes, what can be done with the great output of intermediates? All the world cannot go into the manufacture of dyestuffs. It is a relatively small, though very important industry. With France and England preparing to utilize their intermediates so as to convert their explosive factories into dyestuff lines, what will become of the immense factories erected for the production of the raw products?

The manufacture of intermeditees will no doubt be regulated to meet the demands of the color maker and recovery of crude distillates will diminish. The production of sulphuric and nitric acids and of caustic soda speeded up to a war demand will subside. In war times explosives come first and colors second; in peace times, colors are first, and explosives are second. Action and reaction no doubt, but considerable painful readjustment in between. It would seem that the conclusion of war would apparently find the world flooded with materials suitable for either dyestuffs or explosives.

NEW YEAR AUSPICIOUS

But this is all future. Continuous readjustments will probably discount the shock of peace. The new year opens quite auspiciously not only in the range of colors available but in the price movement tending downward. Capital flows in where greatest return is offered and incidental to such an operation, resources are better utilized, greater chemical and technical skill is available and cost of production is lowered. The larger makers have shaded their prices considerably for 1918 contracts. The law of supply and demand is operating to bring about this change. Sulpur browns and yellows, for instance, in great demand for khaki are somewhat lower in price, but sulphur black will be offered this year by one of the largest makers, so it is reported, at approximately 100 per cent under 1917 price for the same article.

This great reduction is to be ascribed in large part to improved methods of production resulting from consolidation of interests. The future trend of the dyestuff industry is thus indicated—aggregations of brains and capital powerful enough to stand up against after-war competition.

Growth of U. S. Dyestuff Industry

Amalgamations and Entrance of Large Interests Chief Features

THE amalgamation of existing companies and the entrance of large capital through these amalgamations and independently have been the dominant features in the physical growth of the dyestuff industry during the year. For a long time it had been appreciated that successful competition with the combined forces of Germany after the war would in all probability necessitate greater aggregations of capital and stronger financial backing than were in evidence in the isolated companies in existence at the time of the war's beginning, even though a large increase in their capacity and a fair amount in their capital stock had been developed. The backing of the Imperial Government for the German dyestuff industry and its intimate relation with the explosive manufacture gave assurance that competition might be looked for if industries in that country are ever to be resuscitated.

It was therefore only natural that negotiations which had been in progress for many months should result in the formation of a combination of leading American plants with the idea of associating companies that would round out the processes of dye manufacture from the crudes through the intermediates to the complete dyes. Therefore it is recognized that the formation of the National Aniline & Chemical Co., Inc., was one of the logical and necessary developments in the perfection of a self-contained dyestuff industry in this country.

DYESTUFFS COMPANIES COMBINE

The National Aniline & Chemical Co., Inc., the formation of which was inaugurated in June of this year, is a combination of plants manufacturing crudes, intermediates and finished dyes. It was noted before the completion of the company that the eventual capitalization would amount to $20,000,000, consisting of 200,000 shares of 7 per cent preferred stock at a par value of $100,000 and in addition 350,000 shares of common stock without par value.

The two dyestuff manufacturing concerns in the merger are the National Aniline & Chemical Co. and the W. Becker Aniline & Chemical Works. The former has marketed for some years the product of the Schoellkopf Aniline & Chemical Co. of Buffalo, N. Y., while the latter includes the plant of the Standard Aniline Products, Inc. The Schoellkopf plant was started in 1880 at Buffalo, N. Y., but had a precarious existence, owing to the lack of assistance from tariff laws. In 1888 the firm of Schoellkopf, Hartford & Maclagan, Ltd., was formed in New York City to distribute the products of the company. These two firms were later combined under the name of the Schoellkopf, Hartford & Hanna Co., the business commencing operations in 1900. During that year the firm of Stone & Ware Co. was absorbed and in January, 1906, the National Aniline & Chemical Co. was established as the selling agent of the Schoellkopf, Hartford & Hanna Co. The formation of this company simply meant a division of the manufacturing and selling organizations. Steady expansion of business was evidenced, but it was necessary to import practically all intermediates from Germany. With the outbreak of the war, however, a most decided impetus was given and since that time the products of the company have been constantly increased, including important direct cotton colors, as well as complete line of basic dyestuffs and a steadily growing variety of wool and oil colors.

The formation of the W. Beckers Aniline & Chemical Works took place at the end of 1911 by Dr. Williams Beckers, who had been associated with large German dyestuff houses both here and abroad. The capital of this company was $75,000 at the outset, but with the outbreak of the war this was increased to $1,000,000, subsequently $2,000,000 and finally $5,000,000. The Brooklyn plant, located on a forty-two acre site, consists of 39 separate buildings, and the product of

the work consists of a full line of wool, mordant and acid colors, direct cotton and silk colors. The growth of this plant was one of the most interesting features of the American dyestuff business during the early stages of the war.

The Standard Aniline Products, Inc., was formed in March, 1915, with factories at Wappingers Falls and Newburgh, N. Y. Both intermediates and finished dyestuffs were made. It was taken over by the W. Beckers Aniline & Chemical Works early in the year and entered the combination as a subsidiary of this company.

INCLUSION OF INTERMEDIATES

The relation of the manufacture of intermediates to the new combination is seen through the interest of three large companies in the Benzol Products Co., which is amalgamated through the transfer of stock from the Benzol company to stock in the new combine. This company was formed in 1910 by interests connected with the General Chemical Co., the Semet-Solvay Co. and the Barrett Co. and was for the purpose of supplying intermediates for the manufacture of synthetic dyes. Benzol and toluol were supplied by the Semet-Solvay Co., which had installed by-product coke ovens for the distillation of this product. The Barrett Co. had had considerable experience in the distillation of intermediates, such as benzol, toluol, xylol, etc., and was able to supply the required hydrocarbons to the Benzol Products Co. The General Chemical Co. added acids and heavy chemicals for the purpose of producing intermediates and it was upon property of the last mentioned company that the plant of the Benzol Products Co. was erected at Marcus Hook, Pa. This company, although having a hard struggle at first, was able to distribute its products to the already existing dyestuff concerns among which was the Schoellkopf company at Buffalo. This status continued up to the outbreak of the war when a most radical change occurred and it was possible to sell all the intermediates that it could produce to the lately organized dye concerns throughout the country.

In addition to the Benzol Products Co. there are certain other processes controlled by the Barrett, Semet-Solvay and General Chemical companies which have been taken over by the new amalgamation, although the latter companies do not give up their independent existence. Other intermediates than those made at the Marcus Hook plant continue to be produced by these companies. For instance, the Semet-Solvay Co. is one of the largest producers of picric acid in the country, while it also obtains phenol from the products of its coke ovens, which is converted into picric acid.

In September the incorporation of the Century Colors Corporation with a capital of $200,000 under New York laws was noted. This company has a working relation with the National Aniline & Chemical Co., selling its product in part, while it has taken over the sales and technical staff of the Cassella Color Co. The latter continues as the American agent for the products of Leopold Cassella & Co., Frankfort, Germany, but owing to the war has had nothing to offer the trade from this source. Its staff, however, and long connection and acquaintance with the trade provide another means for reaching consumers of National Aniline products.

The intimate relation of dyestuff manufacture to the production of explosives made it logical that E. I. du Pont de Nemours & Co., the largest manufacturers of explosives in this country, should investigate and experiment with the possibilities of producing dyestuffs. For many months it was known that these experiments were in progress in its laboratories and enormous plants and the announcement was inevitable that the company would enter the dyestuff field. Even before the war, these investigations were in progress and since the outbreak of hostilities efforts have been redoubled to bring about a complete production of finished dyes from the crudes and through the intermediates. It is the latter that have been the stumbling block in many cases to the production of complete lines of colors and it was the avowed purpose of the du Pont company not to make announcement of its readiness to enter the finished dyestuff field until this intermediate step could be fully taken. Early in June the announcement was made by the company as follows: "Our development during recent years in the explosive and in several other branches of the chemical industry brings us now to the logical result of undertaking in a broad and comprehensive way the manufacture of synthetic dyestuffs and kindred products." In this issue a further announcement is made to the effect that the construction of the company's dye plants is progressing satisfactorily and on schedule time, that some of the more important ones will shortly come into commission and that others will follow. Headquarters of the dyestuff sales department as well as the dyeworks of the company are in Wilmington, Del. In view of the interchangeability of explosive and dyestuff manufacture the only thing that has held back the prominent entrance of the company into the dyestuff field has been the ever-increasing demand upon its resources for explosives, both by this Government and by the Allies, to whom it has shipped enormous quantities of death dealing material. With the increase of its plant, however, it is expected that sufficient capacity will be had to supply dye consumers in this country with important products and it is known that its capacity when the final announcement of its entrance as a factor in the selling of these products is made will be sufficient to take care of all demand. The securing of certain patent rights of English concerns makes possible the wider diversity of dye products which the enormous capital of the corporation justifies.

According to a compilation recently made the year 1917 is a record for capital invested in drug and chemical firms. Of course the entire amount comprehends other than dyestuff producers, but the development of the industry in all its ramifications is plain to be seen when it is stated that capital aggregating $146,160,000 has been drafted into this division of industrial activity. This is compared with $90,244,000 in 1916, $65,565,000 in 1915 and $16,838,000 during the five months of 1914 or a grand total of $327,807,000 since the beginning of the war.

PROGRESS OF AMERICAN DYES

In discussing recently a new khaki dyestuff, which is now being offered, one who is intimately interested made some pertinent remarks on the general dyestuff situation and the prejudices which American manufacturers have to overcome in winning proper recognition for their products.

"Some people," said this authority, "believed that a fully developed American dyestuff industry ought to have sprung up overnight. Such people not only failed to recognize the great technical difficulties to be overcome, and laboratory problems to be solved; they even went so far as to set up impossible standards which, before the war, the German dyes were never expected to meet.

"A proper realization of this fact on the part of the general consumer would do much to clear up the dyestuff situation. American dyestuff manufacturers ask only for justice and a little patience, and they will give their country a dyestuff industry of which America may well feel proud. In asking for justice, they would remind consumers that the German dyestuffs were always sold 'without guarantee.' The reason for this is that no color ever manufactured is 'fool-proof.' To give the desired result, each dyestuff must be used with the proper chemicals and under the proper conditions. If more care were bestowed on these points, we should hear far fewer complaints of the quality of American dyes.

"American manufacturers have also asked for a little patience on the part of the consumer, and they will then ask no concessions as to the variety or quality of the colors offered. The list of American-made dyes is not only being daily added to, but our chemists are daily improving the quality of the dyes already marketed.

"Take the new khaki dyestuff which our plant has recently worked out. The determination of the best combinations for this dyestuff for a long period engaged the attention of the chemists in our laboratories, and, as the result of their researches, we have now a product which we can strongly recommend.

"But, if they wish to attain the best results, users must carefully follow the proper dyeing formulæ, and see that all the conditions are favorable to the best results. Dyestuff manufacturers are only too glad to answer all inquiries regarding the proper formulæ and conditions under which their dyes should be used. They will also gladly suggest the best methods of meeting unusual conditions."

STANDARDIZING COLORS

Of no little importance in the year's many developments was the project of several manufacturers designed to form an association in the trade. So apparent was the need of an organization that the immediate approval of almost the entire industry was won. The associations' proponents have practically perfected the details of such a body, and its actual organization is expected at a meeting to be held in the Chemists' Club, New York, on Jan. 22 and 23. Chief among the purposes of this association is the standardization of American dyestuff production, and of hardly less importance is the preparation of data designed to assist the U. S. Tariff Board in its census of the industry.

THE YEAR'S ADDITIONS

The Bureau of Foreign and Domestic Commerce of the Department of Commerce has since the war taken several censuses of dyestuff production in this country. Such a list was published in our last Annual. Since then further names have been added and are given:

American Tar Products Co., 203 South La Salle street, Chicago, Ill. (naphthalene—crude flakes). (Plants in six different cities).

Baird & McGuire, Holbrook, Mass. (cresol compounds).

Bayway Chemical Co., Bayway, Elizabeth, N. J. (benzol, toluol, xylol, solvent naphtha; naphthalene, flake and crude; cresylic acid).

C. G. Betts Co., Erie and N. P. Tracks, Spokane, Wash. (naphthalene, flake; crude benzol; carbolic oil—about 15 per cent phenol and cresol).

Samuel Cabot, Inc., 141 Milk street, Boston, Mass. Factory: Chelsea, Mass. (crude benzol, toluol, pure naphthalene).

Chatfield Manufacturing Co., Cincinnait, Ohio (naphthalene—balls and crystals; carbolic acid).

Merck & Co., 45 Park Place, New York, N. Y. (affiliated with The Rahway Coal Tar Products Co., Rahway, N. J.). Branches: St. Louis, Mo.; Montreal, Canada. Factory: Rahway, N. J. (benzol—pure, 90 per cent, 50 per cent; toluol—pure, 90 per cent; xylol, cumol, solvent and heavy naphthas, carbolic acid).

Nebraska Blaugas Co., Twenty-eighth and Boyd streets, Omaha, Neb. (amylene—part benzol).

New Haven Gas Light Co., 80 Crown street, New Haven, Conn. (benzol—90 per cent water white; commercial toluol; crude naphthalene).

Pittsburgh By-Products Coke Co. (H. Koppers Co.), Pittsburgh, Pa. Factories: Camden and Jersey City, N. J.; St. Paul, Minn. (benzol, toluol, naphthalene). Camden plant now in operation, Jersey City will be about June 1, and St. Paul about September 1, 1918.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Union Chemical & Refining Co., Box 974, Johnstown, Pa. (naphthalene, flake).

United Gas Light Improvement Co., Philadelphia, Pa.

INTERMEDIATES

Acme Dye & Chemical Co., Durham avenue, Metuchen, N. J. (beta-naphthol; contemplate the manufacture of trinitrophenol).

American Color Manufacturing Co., 98 Park Place, New York, N. Y. Factory: Passaic, N. J. (beta-naphthol, Schaeffer's Salt, nitrosodimethyl-aniline).

American Synthetic Color Co., Stamford, Conn. (aniline and other intermediates).

Atlantic Dyestuff Co., 88 Ames building, Boston, Mass. Factory: Burrage, Mass. (dinitro-phenol, dinitrochlor-benzol).

Bayway Chemical Co., Bayway, Elizabeth, N. J. (cresol, ortho- technical, and meta-para; xylenol).

Bound Brook Chemical Corporation, 82 Beaver street, New York, N. Y. Factory: Somerville, N. J. (Just starting to manufacture salicylic acid).

California Aniline & Chemical Co. (California Ink Co.), West Berkeley, Cal. Branches: Seattle, Portland, San Francisco and Los Angeles. (p-nitraniline, monosulphonic acid. Pharmaceuticals: bromo acid, cosine).

Catalytic Chemical Co., Third and Bancroft streets, West Berkeley, Cal. (phthalic acid and anhydride; phenolphthalein; bases of all dyes of the following groups: eosines, rhodamines, erythrosines, galleines, rose bengales, indigo and indigotines. Also bases of vanillin, saccharin, and all other derivates of the sulphonates of the benzene nucleus ring).

Columbia Chemical Constructive Co., Fort Washington, Pa. (aniline, oil and salt; nitraniline, nitro- and dinitrophenol, metol, diamidophenol sulphate, p-amidophenol. Pharmaceuticals: acetanilid, guaiacol, phenacetin, pyrocatechin, etc.). Will be in operation in April, 1917.

General Chemical Co., 25 Broad street, New York, N. Y. Factory: Easton, Pa. (allied with Benzol Products Co.) (diphenylamine, dimethyl-aniline and hydroquinone on a large scale; benzidine, sulphanilic acid, diethyl-aniline, tolidine, paranitro-phenol, orthonitrophenol, paramidophenol, dianisidine, and o-nitroanisol on a semi-commercial scale—permanent processes in course of development).

Hord Color Products Co., 424 East Market street, Sandusky, Ohio (a-naphthol, benzoate of soda, benzoic acid). In operation.

Jacksonville Chemical Manufacturing

¶ Do you know a good American when you see one?

¶ This corporation is American owned, is under American control, is operated by American chemists, and makes American dyes from American raw materials.

¶ It has brought together an aggregation of producing units under exclusively American control adequate to safeguard American consumers from the disastrous conditions forced upon the country at the inception of the War in 1914.

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National Aniline & Chemical Company

Incorporated

244 Madison Avenue, New York City

Works

Buffalo
Brooklyn
Marcus Hook
Wappingers Falls

Co., Jacksonville, Fla. (dinitro-naphthalene).

Merck & Co. (affiliated with The Rahway Coal Tar Products Co., Rahway, N. J.), 45 Park Place, New York, N. Y. Branches: St. Louis, Mo.; Montreal, Canada (salicylic acid and salicylates, aniline oil, aniline hydrochloride, benzonaphthol, hydroquinone, m-dinitrobenzol, nitrobenzol, p-nitraniline. Also pharmaceuticals: acetanilid, and in course of development: acetphenetidin, resorcin; and sulphocarbolates of calcium, sodium and zinc).

Merrimac Chemical Co., 40 Central street, Boston, Mass. Factory: Woburn, Mass. (H-acid).

Monroe Color & Chemical Co., Quincy, Ill. (dinitro-benzol, m-phenylenediamine, benzidine and sulphate paste, H-acid). Increasing output soon.

Newport Chemical Works, Inc., 1112 First National Bank building, Milwaukee, Wis. (allied to Newport Hydro Carbon Co.). Branch: 1605 Equitable building, New York, N. Y. Factory: Carrollville, Wis. (a-naphthylamine, dinitro-naphthalene; ortho- and p-nitrotoluol; ortho- and p-toluidine; tolidine).

New York Color & Chemical Co., Inc., 212 Pearl street, New York, N. Y. Factory: Camden, N. J. (b-naphthol, p-nitraniline, and anilines for lake-making).

The Obex Co., Marietta, Ohio. Factory: East Norwood, Marietta, Ohio. (aniline; will be making four products within 30 days). Operating day and night.

Organic Products Corporation, Schenectady, N. Y. (betanaphthyl benzoate).

Geo. H. Segal & Co., Inc., 95 William street, New York, N. Y. (benzoic acid, benzylchloride, benzol-naphthol).

Transatlantic Chemical Corporation, 80 Wall street, New York, N. Y. Factory: Linden, N. J. m-nitro-p-toluidine, mixed toluidine; nitro- and o-nitrotory: Linden, N. J. (m-nitro-p-toluidine, p-nitrotoluol, p-toluidine, tolidine).

United Dyes Corporation, Front street, Perth Amboy, N. J. Branch, 6 Church street, New York, N. Y. (H-acid).

Upton Bros., Bristol, Ind. (aniline).

West Coast Chemical Co., 6961 Woodlawn avenue, Seattle, Wash. (salicylic acid, alpha-naphthylamine).

H. R. Ackerman Co., 65 Fulton street, New York, N. Y. (Concentrated Jacque and Geranium Lakes, Green, Yellow, Orange and Violet Lakes, Cerulean and Alkali Blue Lakes; Prussian Blues, Nigrosines, Acid Black 4BX).

Acme Dyestuff & Chemical Co., Durham avenue, Metuchen, N. J. (Will manufacture acid black and other acid colors).

Alliance Chemical Co., 176 Federal street, Boston, Mass. Factory: Hyde Park, Mass. (Sulphur black, fast red A, Direct colors: orange, yellow).

Althouse Chemical Co., 500 Pear street, Reading, Pa. (Congo red 4 B, chrysamine G; may undertake manufacture of chrysophenine, benzo violet R, benzo purpurine 10 B, diamine black B H).

American Color Mfg. Co., 98 Park Place, New York, N. Y. (Oil colors: Yellow, orange, mahogany, scarlet; also fast silk gray, acid red 4 B).

Atlantic Dyestuff Co., 88 Ames building, Boston, Mass. (Sulphur black D extra on a large scale; direct blue, cotton green, chrysamine).

Beaverkill Dye Works, Cooks Falls, N. Y. (Alizarine yellow R, naphthol green B, gambinine R & Y, opal blue, direct blue, cloth scarlet G, orange 11, sulphur colors).

Bick & Undy, 49 S. Front street, Philadelphia, Pa. (Acid colors: Orange, scarlet; fuchsine, Congo red, methylene blue, direct yellow).

Binney & Smith Co., 81 Fulton street, New York, N. Y. (Soluble black B 1—a substitute for nigrosine in leather dyeing).

Block Chemical Co., 67 Fifth avenue, New York, N. Y. Acid colors: Brown, orange 2 A, scarlet; direct colors: blue, fast red, orange; lake and chrome colors; nigrosines, water and spirit soluble; para reds; Prussian blues; induline and methylene blues; indigotine, Congo red, scarlet 2 R, Bismarck brown R & Y, methyl violet).

Brunswick Chemical Co., Newark, N. J. (Recently incorporated, $200,000).

Butler Chemical Co., 25 Beaver street, New York, N. Y. Factory: Butler, N. J. (Basic reds, greens, blues; also fuchsine).

California Aniline & Chemical Co. (or California Ink Co.), West Berkeley, Cal. (Lithol red M. M. N. P. T. red).

Camden Chemical Co., 42 Broadway, New York, N. Y. Factory: Camden, N. J. (Acid and direct colors).

Catalytic Chemical Co., Third & Bancroft streets, West Berkeley, Cal. (Basis of following color groups: Eosines, rhodamines, erythrosines, galleines, rose bengales, indigo, indigotines). Factory being steadily enlarged.

Chemical Manufacturing Co., 46 Gold street, New York, N. Y. (Nigrosines).

Chrome Color Works, Mattawan, N. J.

Commonwealth Color & Chemical Co., Butler street, Brooklyn, N. Y.

Connecticut Color Co. (A. E. Beauregard), Danielson, Conn. (Bright acid green, for silk or wool).

Continental Chemical Co., 418 North Third street, St. Louis, Mo. (Methylene blue, methyl violet on a small scale).

Cosmic Aniline Works, 8 West Broadway, New York, N. Y. (Malachite green).

Drug & Dyestuff Corporation, 120 Broadway, New York, N. Y. Factory: Burrage, Mass.; West Nutley, N. J. (Sulphur browns and blacks, chrysoidine, chrysamine G; direct colors, green, blue 2 B. Developing various other colors).

Dye Products & Chemical Co., Inc., 200 Fifth avenue, New York, N. Y. (Bismarck brown R & Y, and chrysoidine R & Y on a large scale; naphthol green, fast acid red. Production of direct cotton colors contemplated).

Eagle Color & Chemical Co., 4 Cedar street, New York, N. Y. Factory: Newark, N. J. (Sulphur black).

Fleming Chemical Co., Cleveland, O. (Prussian blue. Dry colors contemplated).

Fulmer & Apeldorn, 23 South Ninth street, Philadelphia, Pa. (Specializing on fuchsine. Expect to soon be able to supply other colors, including Anthraquinone green, patent blue, soluble aniline, blue and green crystals, brilliant alizarine rubinol, etc.).

Haack & Co., 800 Broad street, Newark, N. J. (New corporation to make aniline colors).

Hellenic Chemical & Color Co., Inc., 427 West Thirteenth street, New York, N. Y. (Nigrosines).

Hoffman & Kropf Chemical Co., Meeker & Porter avenues, Brooklyn, N. Y. (Sulphur black).

Holland Aniline Co., 118 W. Kinzie street, Chicago; and Holland, Mich. (Bismarck brown, methylene blue, methyl violet, acid colors, sulphur colors, etc.).

Holliday-Kemp Co., Inc., 90 William street, New York, N. Y. Branches: 151 N. Front street, Philadelphia; 114 State street, Boston, Mass. Factory: Woodside, Long Island, N. Y. (Acid, chrome and direct colors).

Hord Color Products Co., 424 E. Market street, Sandusky, O. (J. K. Britton, Treas.). (Naphthol yellow S. In operation).

Independence Aniline & Refining Co., Independence, Mo. (Incorporated for $1,000,000 to make aniline colors).

Independent Chemical Co., 72 Front street, New York, N. Y. (Factory: Bound Brook, N. J. (Primuline, etc.).

International Color & Chemical Co., 570 Franklin street, Detroit, Mich. (Mineral colors only).

Iridescent Dyestuff & Chemical Co., 247 Bush street, Brooklyn, N. Y.

Jacksonville Chemical Manufacturing Co., Jacksonville, Fla. (Sulphur colors: Black, brown, tan, yellow. Starting manufacture of sulphur green and direct blue).

Louis Jaeck Co., 257 Front street, New York, N. Y. Factory: Brooklyn, N. Y.

Keystone Dyestuff & Chemical Co., 671 Broad street, Newark, N. J. (New company).

L. & R. Organic Products Co., Inc., 8 Gold street, New York, N. Y. Factory: 833 Magnolia avenue, Elizabeth, N. J. (Specialty, nigrosine base and nigrosines, spirit, water, and oil soluble. Preparing to make other aniline colors, particularly blacks and blues).

Lansing Chemical Co., Lansing, Mich.

Mackey Wood Aniline Co., Inc., Haledon, N. J. (Chrysoidine, fast red, etc.).

Melrose Chemical Co., Essex street, Melrose, Mass. (Indulines. Various blues).

Merck & Co., 45 Park Place, New York, N. Y. (Nigrosines, on large scale).

Monroe Color & Chemical Co., Quincy, Ill. (Bismarck brown Y & R; and direct black for cotton, on a large scale. Will produce benzo purpurine 4 B, benzo sky blue, a direct green and a navy blue, but it will take some time to complete arrangements so production is assured).

Mont Color & Chemical Co. (Swift Chemical Co.), 90 Wall street, New York, N. Y. (Chrysoidine, Bismarck brown).

New York Color & Chemical Co., 212 Pearl street, New York, N. Y. (Brilliant lake scarlet, Bordeaux B, acid orange A, tartrazine, methylene blue, auramine).

Organic Products Corporation, Schenectady, N. Y. (Croceine orange, oil yellow, scarlet 2 R. Contemplate making Victoria blue 4 R, wool green S).

Peerless Color Co., Bound Brook, N. J. (Primuline, and direct cotton dyes derived from or related to it. Fast yellow B, union pink, etc.).

Pennsylvania Color Manufacturing Co., 248 Chestnut street, Philadelphia, Pa. (Chrome colors; nigrosine for wool).

Perolin Co. of America, Woolworth building, New York. Factory: Paterson, N. J.; and Chicago, Ill. (Sulphur black).

Philadelphia Aniline & Extract Co., Bourse building, Philadelphia, Pa. (Sulphur black).

Reliance Aniline & Chemical Co., 100 Broadway, New York, N. Y. Factory: 24 Vanderbilt avenue, Brooklyn, N. Y. (Methylene blue).

Saxe Chemical Co., 99 Nassau street, New York, N. Y. (Methylene blue, Bismarck brown).

Geo. H. Segal & Co., 95 William street, New York, N. Y. (Sulphur black, nigrosines, Bismarck brown, methyl violet).

Simeon & Elting, 93 Nassau street, New York, N. Y. Factory: Irvington, N. J. (Yellow lakes; colors for paper).

Standard Color Works, 55 Liberty street, New York, N. Y. Factory: Brooklyn. (Bismarck brown Y, acid black, nigrosine crystals WS, induline crystals WS, Prussian blues, chrome yellow CP, Methyl violet, Methyl violet base, Chinese blue CP, etc.).

Synthetic Products Co., Inc., 447 Olive street, North Tonowanda, N. Y. (Primuline).

Transatlantic Chemical Corporation, 80 Wall street, New York, N. Y. (Investigating with view to manufacturing colors. See Intermediates).

West Coast Chemical Co., 6961 Woodlawn avenue, Seattle, Wash. (Sulphur black in considerable quantities).

Westover Chemical Co., Pennington, N. J. (Sulphur and other colors).

MINERAL DYES

Milson Dye & Chemical Co., 602 Continental building, Baltimore, Md. ("Antholine" dyes for wool, 76 standard shades produced by John R. Milson process based on the use of certain minerals).

VEGETABLE DYES AND EXTRACTS

Baltic Chemical Co., 183 Duane street, New York, N. Y. Factory: Yonkers, N. Y. (Dyewood products. Exports a specialty).

Binney & Smith Co., 81 Fulton street, New York, N. Y. Factory: Easton, Pa. (Vegetable blacks).

John H. Heald & Co., Inc., Lynchburg, Va. Branch office: East Radford, Va. (Logwood, hematine, hypernic, fustic, osage orange, and quercitron bark extracts. Also tanning extracts from chestnut wood, chestnut bark, and hemlock bark).

Hub Dyestuff & Chemical Co., 595 East Seventh street, South Boston, Mass. (Logwood steam black grays, vegetable yellows, browns, etc., for calico printing, yarns, and warps. Special logwood blue and special mordant for woolen dyeing).

John D. Lewis, 1209 Turks Head building, Providence, R. I. Branch office: 6 Cliff street, New York, N. Y. (Various vegetable dyestuffs and extracts).

Lower California Chemical Co. (C. W. Hill Chemical Co.), Los Angeles, Cal. Factory: National City, Cal. (Archil extract conc., cudbear powdered). Now in operation—large output contemplated.

Mt. Union Tanning & Extract Co., Mt. Union, Pa. (Logwood products, fustic, quercitron).

Neponset Color Co., Hyde Park, Boston, Mass. (Considerable output of vegetable dyestuffs). In operation since 1912).

The Obex Co., Marietta, Ohio. Factory: East Norwood, Marietta, Ohio. (Logwood extract, solid and crystals; hematine paste, solid and crystals; chestnut extract, osage orange extract). Large production.

Taylor, White Extracting Co., Cooper River & Pine street, Camden, N. J. (Extracts of hematine, logwood, fustic, quercitron, sumac, mangrove, and myrabolans, in liquid, solid and crystal forms).

United Dyewood Corporation, 80 Maiden Lane, New York, N. Y. (Absorbed American Dyewood Co. Several branches).

H. E. Young & Co., Charlottesville, Va. (Large capacity dyewood and tanning extracts.)

As a supplementary list the following names were published in November in addition to those already listed:

CRUDES

By-Products Coke Corporation, Chicago, Ill. (Large capital—benzol and other products).

Youngstown Chemical Works, Youngstown, Ohio. (Phenolphthalein U. S. P.).

ARTIFICIAL DYESTUFFS

Embree Manufacturing Co., Inc., 46 Gold street, New York, N. Y. (Nigrosines).

Empire Chemical Co., 149 Broadway,

DU PONT AMERICAN INDUSTRIES

DU PONT

ESTABLISHED 1802

Du Pont American Industries

This organization of industries exemplifies a new epoch in world commerce—the era of amalgamation of related industries as contrasted with the prior era of concentration on the development of a single industry.

Popular sentiment and law oppose the trust idea—the control by one concern of a majority of the nation's industries in one line—but industrial progress demands and welcomes the idea of using the experience, capital, organization and facilities of a successful business to develop other industries that are related to it either in manufacturing or selling problems.

Du Pont American Industries are American in origin, financing, management and operation. No allegiance is paid to foreign capital or control. They are crystallized around an aggressively progressive manufacturing institution showing an unbroken record of 116 years of constant development along practical lines of industrial manufacture, purchase, finance and sales; and which has through all of its history been a loyal supporter of American affairs and of the Government of the United States. The fair attitude of the Company toward all lines of allied business and toward the buying public has permitted it to establish its trade-mark, the Du Pont oval, as a positive guarantee of quality and service, which guarantee is now extended to all of its lines of endeavor.

The permanency of this guarantee is assured through the ample financing of all interests; through the ability and efficiency of engineering and operating departments; through a purchasing department that searches the world for the best raw materials; and through a sales department that makes detailed studies of domestic and export needs, and of the most economical methods of filling wants.

The different Du Pont industries are all, in a way, separate and distinct, but have as common bonds the intimate interlinking of the various highly specialized chemical units, and administrative control. No separate unit is primarily dependent upon the others, and the various materials manufactured by any one unit are in no way by-products of other units, but are in all general classes, specifically manufactured for the purposes for which they are sold.

The following major items will show briefly the intimate relation of all units of Du Pont American Industries, and the capacity, through properly co-ordinated plants, to take an active part in meeting foreign competition in times of peace, by furnishing the world with standardized American products of proven worth.

DU PONT

DU PONT AMERICAN INDUSTRIES

EXPLOSIVES Chemistry enters most intimately into the manufacture of all classes of explosives, from the ordinary black powder of historic fame and modern use, through the dynamites, permissible explosives, sporting and military powders, to the most delicate of fulminating detonators. Acids, nitrates, stabilizers, absorbents, nitrated cotton and bases are required. Industrial explosives of the classes enumerated are absolute essentials to mining and to the iron and steel industries, on which all industrial and much agricultural development depends.

FABRIKOID The nitration of cellulose which is the base of the manufacture of modern explosives, is at the same time, when properly compounded with various colors and dissolved in much the same class of solvents, the main coating for leather substitutes, the demand for which is rapidly increasing.

PYRALIN A similar connection exists between Pyralin and the other products mentioned. Here, too, the nitration of cellulose is the principle on which the business is built.

PYROXYLIN LACQUERS, ETC. Pyroxylin lacquers, enamels, split leathers, leather substitute solutions and a considerable variety of other compounds also find their origin in the nitration of cellulose and in the dissolving of the material formed. In each process similar acids and solvents and similar processes are used as in the cases already mentioned.

PAINTS Another phase of the chemical industry is the manufacture of paints. Here, also, we have the use of practically the same chemicals, colors and ingredients as in other Du Pont products. It is in reality a highly specialized branch of the chemical industry.

DYESTUFFS The bases from which most of the military high explosives are derived are obtained as by-products of the coking industry and from the same source are obtained the bases from which are manufactured the intermediates and finally the dyes so much needed today to supply practically every other industry. This is the reason why all these industries fit comfortably into the general organization as separate but closely allied units.

This announcement is made by the DYESTUFFS SALES DEPARTMENT for the purpose of fixing in the minds of all, the logic of the development and the strength of the foundation upon which it rests. The construction of our dye plants is progressing satisfactorily and on schedule time; some of the more important ones will shortly come into commission; others will follow.

E. I. du Pont de Nemours & Company

DYESTUFFS SALES DEPARTMENT

WILMINGTON DELAWARE

THE DU PONT AMERICAN INDUSTRIES ARE:—

E. I. du Pont de Nemours & Co., Wilmington, Delaware.....Explosives
Du Pont Chemical Works, N. Y., N. Y.....Pyroxylin, Coal Tar Chemicals
Du Pont Fabrikoid Company, Wilmington, Del.....Leather Substitutes
The Arlington Works, 725 Broadway, New York, N. Y.
Ivory Py-ra-lin and Cleanable Collars
Harrisons, Inc., Phil., Pa.....Paints, Pigments, Acids and Chemicals
Du Pont Dye Works, Wilmington, Delaware.....Dyes and Dye Bases

DU PONT

H. A. METZ & CO., Inc.

122 HUDSON ST.

BOSTON
PROVIDENCE
PHILADELPHIA
MONTREAL

NEW YORK

CHICAGO
SAN FRANCISCO
CHARLOTTE
ATLANTA

PRODUCTS:

Dyestuffs, Colors, Intermediates, Sizing and Finishing Materials, Pharmaceuticals, etc.

Dyestuffs Colors Sizing and Finishing Materials	*Produced by*	Consolidated Color and Chemical Co. Newark, N. J.
Dyestuffs and Intermediates	*Produced by*	Central Dyestuff and Chemical Co. Newark, N. J.

New York, N. Y. ($200,000 capital—magenta, primuline and developing other colors. Also make following intermediates; toluidine, ortho- and paratoluidine, aniline oil, oil of myrbane, etc.).

Linberg, J. B., 101 Beekman street, New York, N. Y. (Chrome, acid, direct, and basic colors).

Max Marx Color & Chemical Co., Irvington, N. J. (Dry colors for printing ink trade; specialties: yellow and green lakes, para reds and alumina hydrate).

Meth-O-Lene Co., Inc., 81 Fulton street, New York, N. Y. (Methyl violet, methylene blue, etc. Plant for chrysoidine soon to be in operation.

Wallior Chemical Co., 1010 Camp street, New Orleans, La. (Water and spirit soluble browns, blues, greens, and reds—on contract only, in quantities ordered).

VEGETABLE COLORS

Dale Manufacturing Co., Wapanucka, Oklahoma. (Osage orange for khaki).

Chemistry, Textiles, and the War

World Conflict Giving Chemist His Proper Place—Work to Be Done

By *Charles F. Goldthwait*

THERE are four great lines of industry which are essential to the war; chemical manufactures, machinery, agriculture and textiles. The importance of each of these, if not already familiar, has been made so by the popular and technical press of the last three years, but now that we have a far more vital personal interest, these matters should be brought still more forcibly to our attention. The engineering and scientific societies and the trade associations of the country are all working to be of the utmost possible assistance, and in their meetings are largely confining themselves to war topics.

A CHEMICAL WAR

This is a chemical war in many less spectacular ways than the manufacture and effects of explosives and poisonous gases. Among the less conspicuous are the purely textile applications of chemistry. Of these, perhaps first in importance is the bleaching of cotton for guncotton manufacture. This already runs into a tremendous tonnage and while it is carried out along the same general lines as other cotton bleaching, the requirements are very exacting and the product is subjected to careful control by chemical analysis for residual impurities. Another almost equally refined product is absorbent cotton, bleached in the same kiers as guncotton, but for quite the opposite purpose. It, too, has to meet certain requirements that are best defined in the terms of chemical analysis. If these requirements are met, the properties of the product and efficiency of the bleach are then beyond dispute.

There are government orders for millions of yards of gauze for surgical use, and other orders for immense amounts of cotton goods for tents, light weight clothing and many other purposes. As far as this has to be bleached, it should be subjected to careful analytical control by tests of solutions as they are being applied and further tests of the goods after each operation, to be sure that any residual acid, alkali or chemic is thoroughly removed after doing its work and before it can cause any injury. Every yard tendered or otherwise damaged is not only a waste, but cuts down production, perhaps at the very time of greatest need. Such trouble can be almost entirely eliminated by proper supervision and at comparatively little expense. Similar methods are already followed in up-to-date bleacheries and the fact that such firms employ them should be sufficient recommendation.

POSSIBILITIES IN DYEING

Coming to the dyeing of khaki and olive drab, there are new problems for the chemist as well as the dyer. Mineral khaki dyed from chrome and iron is a separate problem in every mill and we may almost say, on every machine. It can be done in a variety of ways and on different types of equipment. Perhaps a little search will reveal possibilities in discarded padders and agers that can be rebuilt to dye this government tent cloth.

Sulphur dyes in their present stage of development are also full of possibilities for chemical reseach. New dyes, slightly faster, are always welcome and there is plenty of opportunity for improving the methods of dyeing them in the piece to get more uniform and level results as well as to reach the standard set by government tests. This is for the most part purely chemical work involving, first, a study of colors and their impurities with the effect of the latter on dyed results, and, second, a study of additions to the dye bath, involving a search for materials that will retard oxidation, or more properly control it, and at the same time promote penetration and levelness.

At the first Exposition of Chemical Industries in 1915, there were good exhibits of American-made dyes, but nobody had much of anything to sell. Now we have vastly larger manufactories and a wide range of available colors to select from. To get a satisfactory olive drab on wool, even with all the German coal tar dyes available, was a rather formidable task if the utmost requirements of the specifications were adhered to. Naturally with fewer brands on the market it is more of a problem. There is no good reason why chemical research should not, however, be especially directed toward the development and manufacture of dyes for these special shades. While at present millions of yards are being colored, the results are not any too satisfactory and an extended organized investigation covering all available natural and synthetic dyestuffs of reasonable fastness might finally yield some excellent combinations. Often colors that are inferior in some one particular will show up well in compound shades, the deficiency being masked by other dyes in the formula that are fast in the particular respect in question.

There is still some trouble in dyeing blues. The amount of indigo available for raw wool stock is insufficient and the dyeing process slow. To expedite production it may yet be allowable to color some classes of goods with alizarines or other more available chrome blues in the piece. Meanwhile a little research in the laboratory with a view to having suitable formulas in readiness may be well repaid in the saving of time later.

With the recent announcements of the reorganization of the National Aniline and Chemical Company and the entrance of the great du Pont interests, the success of the American dyestuff industry is assured beyond a doubt. Already it is said on good authority that about 70 per cent. of our goods are dyed satisfactorily and most of them with our own dyes, the balance of less than one-third being colored with dyes not quite as suitable for the purpose.

Conditions, however, may soon warrant the working of foreign patents for the manufacture of fast vat dyes of the hydron and indanthrene types, and some other particularly desirable patented specialties. The former are already being brought out in England. We should be able to work these out as well as the proposed manufacture of some synthetic drugs not now available and covered by German-owned patents. These fast dyes with a few other items not yet attainable will give us a practically complete range.

CHEMIST IN CONSERVATION

The textile chemist's task is not only in the direct preparation of materials needed in the conduct of the war. Conservation is more than ever the cry. Shoddy usually presents difficulties in carbonizing, stripping and redyeing, all of which are more problems for the chemist and dyer.

Conservation and food control may lead to restriction of the use of starches. Reports are already in circulation that wheat starch manufacture will be limited. From starches made from grains and other materials suitable for human food, it is then only a short step to those of more particular value as cattle feed. Present prices of grains are not only making beef and dairy products high, but threaten a real shortage. If these considerations force Government action on starches it seems that rightfully this should apply first of all to the more heavily starched finishes where large amounts of farinaceous materials are used and last to warp sizing where starch is more of a necessity. In some cases it may be possible for the present to exchange one form of starch for another.

Meanwhile some chemical material, either natural or synthetic, cheap and not useful as food for man or animal, capable of being applied as easily as starch, and having its desirable properties, may be discovered. It will require diligent search among the by-products and waste materials of many industries and a study of gums and extracts from plants or investigations into the possible modifications of such gums or extracts. It is not at all impossible, however, that some such material can be developed as there are at present several gums on the market whose possibilities have no doubt not yet been fully exploited. (Obviously this does not refer to British gum, or other so-called gums sold for sizing which really consist only of modified starches.) Such an extended research would no doubt be beyond the ability of any one mill to undertake, but if once entered upon by anyone sufficiently interested and carried to a conclusion, the results might be of very great value.

TESTING MATERIALS

It is also quite legitimate to keep one's own interests in mind and a line of work that every mill can undertake either in its own or an outside laboratory is the examination by analysis of its supplies. The high prices now prevailing are a temptation to adulterations of even the common articles such as acids and alkalies, formerly too cheap to be profitably manipulated. If on account of the present scarcity of heavy chemicals it is found best not to make serious complaints it is worth something to know what dealers have taken advantage of their customers and later to treat them accordingly.

There is also more chance for work in connection with the dyestuff supply. Some colors, like sulphur black and methyl violets, are on the market in various strengths from a variety of makers. In these cases competitive money value tests should be made and may prove far more fruitful than the hair-splitting tests that were often run during the lively competition just before the war, when often only a cent or two per pound was at stake.

The numerous new colors continually appearing require to be tested carefully for strength, working properties and fastness, particularly as many of them are claimed to embody improvements over the colors first put on the market by our dye firms to satisfy the recent stringency. As a specific case, new reds of the nature of Benzo-purpurine or Delta-purpurine are now appearing to replace Congo red, with better shades and properties.

In conclusion, it is only fair to again recall what the chemists have done in the past three years in the textile field. The debt is most conveniently measured in terms of dyestuff factories. The number has grown from five to many times that number of establishments making either dyes or the necessary intermediates. The production is now fully ten times as great and may reach fifty million or more pounds as this year's total. The chemist has been growing into his proper place in many industries and now at last into textiles where so many of the operations involve the action of chemical reagents on impurities in the fiber or upon the various fibers themselves, all of which are, strictly speaking, chemical materials.

New Chemical Section Formed

One hundred and twenty-seven chemists residing in or near Wilmington have formed the Wilmington Section of the American Chemical Society. L. duPont was chosen presiding officer. The new section covers Delaware and Salem County, N. J. As a result of the formation of this new section and the consequent withdrawal of 127 members from the Philadelphia section, the latter has dropped from second place to third place in the national society. However, fifty new members have already been added within the past week or so and it is expected the gap will be filled by June 1.

Dye and Chemical Notes

The benzol plant of the Cambria Steel Co. at Jamestown, Pa., was damaged by fire Saturday night. The loss is estimated at about $30,000; work of rebuilding will be started at once.

The Nitro Chemical Co., New York, has acquired a portion of the plant of the Canadian Car & Foundry Co., Kingsland, N. J., and is planning for the establishment of a works for the manufacture of chemicals. The company has awarded contract to William J. Burke, Lyndhurst, for the construction of the plant, which will give employment to about 500 hands for initial operations.

Need for Caution

LAGRANGE, GA., Jan. 7 (*Special*).—"In my opinion the business outlook for 1918 is hardly susceptible to ordinary calculations as everything must be subordinate to the grim business of winning the war. The longer the war is protracted the greater will be the extent to which the Government will absorb all essential industries. Materials and labor and use of non-essentials will diminish relatively. I expect a severe strain upon business and industry during the period of readjustment at the end of the war and consider it unwise for anyone to become unnecessarily extended."

FULLER E. CALLAWAY,
Pres. American Cotton Manufacturers Association.

DYESTUFFS.....

If the users of extracts for dyeing will insist upon their being supplied with the YOUNG brands they would soon learn the difference between the YOUNG products—and others.

Stainless Sumac Extract "C.P." 46°
Refined Sumac Extract P.S. 51°
Quercitron Bark Extract "X"
Quercitron Bark Extract R. E.
Quercitron Bark Extract "M"
Shrewsbury Mills Lemon Flavine
Shrewsbury Mills Orange Flavine
Logwood Extract "Y" 51°
Logwood Extract Solid
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the relation of the various industrial committees that had been acting both as Government agents or advisers and as representatives of their respective industries. The only way in which this could be done was by calling for the resignation of all of the committees. The members of the Joint Committee of Wool Manufacturers thereupon promptly severed this direct connection with the Government. Julius Rosenwald, Chairman of the Committee on Supplies, courteously expressed his appreciation of the service which the Joint Committee had rendered.

Within a few days after the resignation of the Joint Committee, its Chairman, Nathaniel Stevens, was officially appointed by the Committee on Supplies in Washington to be a member of that body directly representing the wool manufacture of the country. Mr. Stevens accepted the nomination. Subsequently the Washington authorities called for the selection of a War Service Committee to represent the entire wool manufacturing industry of the United States, but not to be a part of the Government organization. At this writing the new Joint Committee is in process of being formed.

ACTED ONLY IN ADVISORY CAPACITY

It should be stated that the Joint Committee of Wool Manufacturers as a whole had never acted in any other capacity than an advisory one; it had never made any purchases of materials or counseled the Washington authorities as to any definite contracts, the actual buying of military or naval fabrics having been made by accredited agents of the Government.

Careful records have been kept of the proceedings of the original Joint Committee of Wool Manufacturers, and periodical reports of its activities have been made to Washington. The duties of the committee proved to be laborious and exacting beyond expectation, but the task was cheerfully performed, and the members of the committee toward the close of their labors had the satisfaction of hearing the public statement of Vice Chairman Eisenman that "From my intimate connection with the woolen industry for the past seven months, I can frankly say that I have not been in contact with any industry that has met the situation as finely and openly as has the woolen industry."

Textile School Work

(*Continued from page* 112)

woolen or animal fiber. Part of that fiber was identifiable as mohair, presumably from Turkey, and for the rest the cloth was made of paper yarn, a good proportion of flax and a smaller percentage of cotton. If later samples taken during the winter fighting should contain more wool the inference would be that in order to conserve their supplies, the enemy issued a poorer fabric for summer than for winter. The poverty of the specimen does not prove absolute exhaustion, but points to sore straits, ingenuity and prudence. The present German scale of issue is not known, but probably it cannot be very different from four suits per man per year.

THE NEED OF FARSIGHTED MEN

Experimental research work is being done with an eye to the needs of after-the-war trade and is in part directed to the utilization of materials hitherto neglected by British manufacturers. The reason why certain merino wools have gone to the Continent instead of to Bradford is no mystery. The wool was suitable to Continental and unsuitable to British combs. There has been no change in Bradford combing machinery qualifying it to cope with the shorter South African and South American merino, and none can come suddenly. The chance of using soft, short and possibly cheaper wools upon existing machinery is always worth consideration, and one current experiment is intended to test the practicability of dispensing altogether with the combing process in producing soft-handling cloths upon worsted machinery. Australian merino, 64s quality, of fiber 4-inch to a half inch in length, is being lifted from the card to the worsted mule with all its noil in. The hope is that the short fiber will assist the exceptional softness that is sought, and that any irregularities in the yarn will be fully concealed by the milling and scouring that the cloth will get. Whether the market will appreciate such a fabric rests to be seen, but something can be learned from merely moderately successful experiments.

CONSIDERING COMBINATION FOR EXPORT TRADE

The College is the mother of the Bradford Textile Society and the debates of this body upon trade affairs give some clue to trade opinion. Recent discussions point to a great searching of mind as to the possibility of combining for export trade. Arising out of the suggestions a combination of a limited number of manufacturers and merchants is to be formed, but it does not appear that all producers are ready to enter into direct trading with consumers, or that a combine of a very large part of the manufacturing trade is feasible.

Textile Man's Observations (Fish)

(*Continued from page* 113)

Bolivia where the climate is as fine as in our southern California, where all fruits, vegetables, cereals grown in the United States could be raised with minimum cultivation. The country is practically undiscovered, speaking from a commercial viewpoint. The government is stable, and with the improving of transportation facilities the popula-

WEAVING PONCHOS

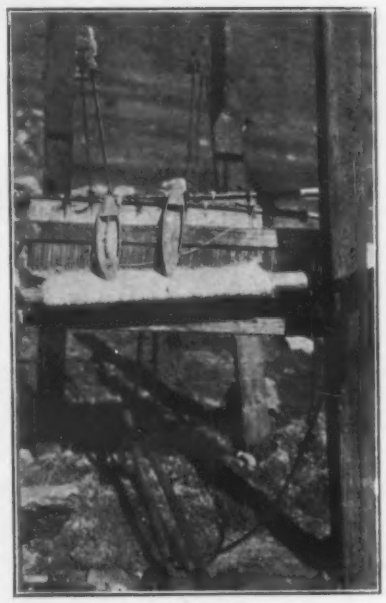
tion is sure to increase rapidly. There is practically no manufacturing of any kind and the opportunities for trade are excellent, if you know how to go about it.

Peru on the west coast is doing much already in manufacturing. They have several cotton mills, some of them as fine mills as can be found anywhere. They have woolen mills and machine shops. Their imports, however, are astonishly large and important.

Chile and Argentina are remarkable countries in many ways. Argentina has an area of 1,135,840 square miles, with an estimated population of over 8,000,000. A large part of Argentina has a fine climate and has good agricultural and grazing lands.

THE NEED OF FARSIGHTED MEN

The colonization of South America, if we can use this expression, has already begun; it began years ago. There are sections near the large cities that are quite densely populated, but there is still much fine land with good business opportunities for many more millions. It will be many years before manufacturing in South America will be able to keep pace with the demands of its people and immense quantities of



A BOLIVIAN WOOLEN LOOM. HAS TWO HARNESSES OPERATED BY FOOT TREADLES; REED WITH DENTS OF WOOL YARN; SHUTTLES THROWN BY HAND

goods and materials will be imported annually.

The lack of transportation is the great drawback. These vast plains are inhabited only by a few Indians, with only here and there a town or a city of any importance. There are few railroads because there are so few people, and there are few people because there are no railroads there. The greatest need is public-spirited and far-seeing men with capital who will do for these countries what James J. Hill did for our great northwest.

It is only a question of time when all things will come, but even under the present conditions the markets are important and there are opportunities for trade which the business men of this country must not overlook. Our factories are quite busy today and this may be a reason for delaying, but the time is surely coming when we will be either a factor in these great South American markets or a cipher, forced out entirely. If we can only get a good foothold now when the coast is clear, we ought soon to establish the fact to the satisfaction of all parties concerned that the American markets are for the American people, and not for the Germans or anyone else.

A journey through the South American countries is most interesting, especially to one who can adapt himself to conditions which exist there. In the large cities you will find many comforts of home and some comforts which we here in Yankee land do not know. The rush of the elevated and of the elevators is lacking; in fact, all rush is lacking. In its place we find moderate and easy-going methods; just as effective perhaps, but much more deliberate. It is the custom, more or less, to put off until to-morrow what can be done to-day; it is an old country and its traditions have not been as yet entirely eliminated. We find a tendency to laziness in all tropical countries, but South America is not a tropical country in the strict sense of the word although the equator passes through Ecuador and northern Brazil. Along the low inland plains and in the jungles it is tropical, but in the mountain regions and in the south the climate is temperate and even cold.

INDIANS WOULD MAKE GOOD WORKMEN

I do not call the Indian lazy, although some do. His bringing up and his general surroundings have taught him to be more or less indolent and the use of the coca leaf and government alcohol has not brightened his mentality. I believe that with proper surroundings and a little training he would make a good workman. Outside of a few large cities you will find the native employing methods in his every-day life as did his forefathers. Unlike the people of this country he seems quite indifferent to inventions and improvements.

TEXTILE METHODS ARE CRUDE

Hand spinning and hand weaving are universal. The spinning is done on a large wooden spindle, and the weaving on a simple frame, rather than on a hand loom. I saw only a very few frames which in any way approached our idea of a hand loom. These have no lay, and usually no reed, the filling threads being beaten up into place with the point of a cow's horn. The weaving of a pattern is always done on a frame and no harnesses are used, the warp threads being manipulated, one by one, by hand.

1.—ALPACAS IN A PERUVIAN VILLAGE. 2.—PACK TRAIN ON THE PERUVIAN DESERT. 3.—LLAMAS CARRYING TIN ORE IN AREQUIPA, PERU. 4—A PACK TRAIN IN LA PAZ

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see evidences of the German aniline dyes.

The Indians are very partial to brilliant colors and their costumes, no matter how old or what their condition, are picturesque. As you travel along the Andes you see here and there bits of brilliancy; at times a woman or a girl tending a flock of alpacas, or llamas, or native sheep; and at times an Indian man or boy clothed in a poncho and in trousers having a slit in the back of the leg, both made of homespun wool; usually the feet are bare, no matter how rough the going.

A TYPICAL INDIAN CITY

LaPaz, Bolivia, is typically an Indian city; there are nearly 80,000 Indian inhabitants, and the street scenes, especially during market days, are most interesting. Pictures showing the Indians in the streets of LaPaz ought to be in colors to give the full effect of their brilliant costumes. In spite of the large Indian population LaPaz is one of the cleanest and one of the best governed cities I have ever visited.

I have spoken of the lack of transportation facilities, referring to the lack of highways and railroads. Transportation is universally carried on with llamas and mules. Large numbers of llamas and caravans of mules are constantly crossing the country in all directions. The cost of transportation in this way is amazingly cheap, but deliveries are extremely slow. The llama, the South American "Ship of the Desert," is an intelligent looking animal; in some respects he does not belie his appearance, but on the whole is inclined to be stupid. He will carry

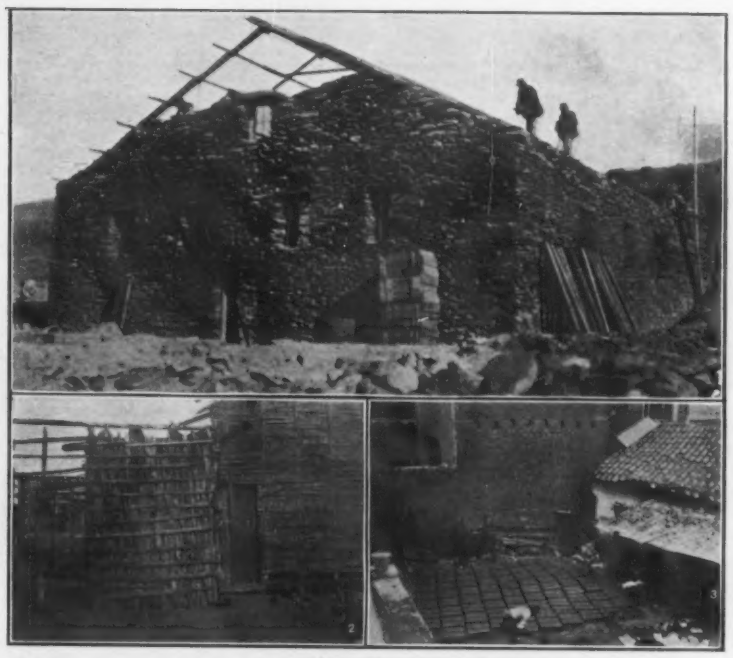
VICUNA

a load which suits him as to its weight or feel, but promptly lies down if overloaded or abused. The llama is sheared for his wool, which is used at home almost entirely.

The great wool producer along the range of the Andes in Peru and Bolivia is the alpaca. This industry is growing rapidly and there are many very extensive alpaca ranches. The vicuña of the Andes resembles, in a way, the llama. He is extremely wild and has a very beautiful fur, which brings high prices.

FAULTY PACKING CRITICIZED

To return to the question of our trade in South America, I may state that there is perhaps more fault found with the indifferent manner in which we pack our goods destined for South America than with any other shortcoming. This applies not only to textile fabrics, but to almost everything else



CONSTRUCTION WORK IN THE ANDES, TOP.—STONE AND STEEL SMELTER, BOTTOM.—NATIVE HOUSE ON WEST COAST. BRICK YARD IN LA PAZ

which they import from the United States. There seem to be two things in connection with this which we do not understand; namely, that owing to local conditions and the lack of transportation most articles are sooner or later transported on the backs of llamas or mules, or on the backs of the Indians themselves. Packages must be put up in as convenient form as possible to meet these exigencies. The other question relates to the strength of cases or coverings. The west coast steamers have side hatches and they load and unload from lighters; nearly always the steamers lie off the port and all freight is taken ashore in large lighters. The sea along this coast is seldom quiet, the long rollers from the Pacific being almost always in evidence. The lighters, which are tied alongside with heavy hawsers, slide up and down the ship's side as the sea dictates. I saw all kinds of freight, including automobiles, hoisted from the ship and put aboard these lighters without any protection except the remnants of what left New York as a perfectly satisfactory wooden case, or a covering of cloth or burlap. These coverings were without doubt sufficiently strong to go any distance in a freight car and to be carefully unloaded at the end of the journey, but were entirely inadequate for the rough handling on the west coast steamers as well as in the native lighters and during transportation on shore.

QUALITY OF PACKAGE AND GOODS EQUALLY IMPORTANT

As a good illustration, I saw on the wharves in Arica, Chile, two large cargoes of Portland cement in barrels. These cargoes came from two different American manufacturers. Arica is one of the large ports of entry. I asked the American Consul, who was with me, what brand of Portland cement was the most popular in that region, as indicated by his consular returns. His reply was that there were several kinds received, some of them in more or less large quantities, but that there was one particular brand received in shipments as large as all the others put together. I was surprised at this, for the reason that the popular brand mentioned was not a particularly popular brand here in the States. Upon further questioning, however, I found the reason for this popularity. The barrels in which the cement was shipped were perfect. They were evidently made specially for this trade; they had extra thick heads and strong hoops, and not one barrel in one whole shipment, which was on the dock, was broken. In the other shipments there was hardly a barrel in good shape. It was evident that before they could reach destination in the interior there would not be much left of barrels or cement.

I saw a similar illustration with a shipment of canned goods from the States. The wooden crates in which the cans were packed were badly broken and a large percentage of the cans had been lost or stolen. The merchant who imported these goods told me that he had had the same trouble with former shipments from these people and that he never would order from them again. All this you may say is the fault of the rough handling on the west coast, and whereas this statement may be in a way true it is equally true that a little more care, and possibly a little higher cost in preparing the packages, would have brought the goods through without damage. In many articles shipped to South America the quality of the packages is about as important as the quality of the articles or the materials themselves.

In closing, I want to say that in my judgment the objections to trading in South America, and the difficulties connected therewith, in some respects have been greatly exaggerated. It may be that this is a further evidence of the German propaganda. Quién sabe?

Perils of Labor (Kellor)

(*Continued from page* 114)

Providing machinery and making plans for transferring the alien enemies from war zones to non-war industries is an immediate necessity. Such alien enemies should be either interned or placed on probation in non-war industries under the surveillance of responsible loyal Americans, without loss of time and they should be prohibited from moving from place to place without permission. They should not be thrown one yard outside of a 100 yard limit to drift or the internal perils to industry may exceed the danger to ships and docks.

At the present time we have no better methods than this: The United States Marshal decides that an alien cannot be employed in a certain industry. Instead of notifying the Federal Employment Bureau of his intended eviction so that the alien can be transferred without delay or loss of time to a non-war industry, he is left to shift for himself. This is needless waste.

DIRECTION OF FEMALE LABOR

Women are most certainly going into industries ill fitted to receive or protect them and some authority must be centered to direct such employment. When it is recalled how the section hands on railways are housed in dirty, vermin-ridden, derailed cars and the character of their work is considered, one regards the announcement of a certain railroad that it is employing women section hands, with some alarm unless assurance is forthcoming that they will be better protected than men have been. The employment of women in certain industries should be by permit only after assurance that their welfare and housing are satisfactorily provided.

The Active Service Auxiliary of the National Guard of New York State found in 1916 that the calling of guardsmen to the border released a considerable amount of new labor. Out of 545 families, 409 persons accepted positions. Many members of the families said they preferred work to assistance, and with their husbands and brothers and fathers away they had time to devote to productive labor.

The systematic use of the draft records by such a Priority Board on Labor and an appeal to these women to accept employment will doubtless add many workers to the lists. In the contest which is coming for labor, the balance must be preserved by some Government agency. We have had enough of studies and investigations and laws and recommendations. We ought to do something and do it now and we have to begin with some board which is partial to no department or industry, to no employer or employe, which will guide labor that is seeking work or change into channels according to the priority of the need—in proportions of skilled and unskilled as the situation demands.

In the matter of the draft, as a means of stabilizing labor, a recent experiment in Connecticut is of interest. A number of employes were exempted on the ground that they were indispensable to the industry. One of them somewhat later led a strike but the business of the plant went on as usual. His exemption was withdrawn and he is now serving in the army.

STOP ENTICEMENT OF LABOR

What the situation demands to-day is that no man shall be taken or enticed from any industry until we know two things—where he can be used best according to his ability and the need, and how taking him is going to affect the industry he leaves. This means an end of the competition between industries. The English law prohibiting the soliciting of employes by employers otherwise than by notifying vacancies to the Government exchanges or assisted by them will be inevitable in some form in America if this war is to be long.

Certainly such a Priority Board on Labor in giving industries priority in placing men would also eventually take into consideration the ability of such industries to get and keep men, and to reduce causes of unrest, strikes, disorder and waste to a minimum.

CO-OPERATION OF EMPLOYERS

It is just here that the co-operation of employers is indispensable. No Pri-

ority Board on Labor can succeed without their co-operation. No law can be enforced that the people are unwilling should be enforced even in war time; no rule will be obeyed that the majority do not stand for; no agreement will be effectually kept that is forced upon unwilling men; no plan will be effective that the leaders do not understand and help make. America has not the machinery or police-power or the will to do this over its vast domain of many peoples in many states in a thousand lines of work. Men will always find a way to evade that in which they do not believe and to defy what they do not understand.

Each employer must begin this system in his own plant. It is not for the Government to impose it from Washington.

It is for you to make places for alien enemy workmen in your shops and to insist on a transfer system.

It is for you to stop soliciting workmen and to insist that other employers join you.

It is for you to establish central employment offices and establish industrial justice as between all workmen and cut down labor turnover.

It is for you to protect the women you employ and maintain standards.

It is for you to insist that the Government regulate private agencies and centralize this work, for you are the public opinion and efficiency which constitute the Government by your representatives in Washington.

It is for you to eliminate causes of unrest within your own factory doors. The Government has little time to-day for the industrial leader who whines about the situation and confesses his inability to lead his factory division. It expects you to do with what you have and to use the talents you have been given.

It is for you to turn foreigners into citizens, and sullen, neglected, badly treated aliens into loyal Americans You have them the best part of their working hours when they are most receptive to American impulses and influences.

It is for you to provide standard measures of safety and health which will keep every person fit.

It is for you to dilute your labor force and share your skilled workmen to bring up the efficiency of other plants. It is not enough if you are 90 per cent. efficient if your neighbor is but 50 per cent. efficient. You help the Government if you find a way to make him 90 per cent. efficient. This is war Americanization. This is the man-power engineering that will win the war.

A Priority Board on Labor is essential in order that you may have a goal toward which to direct your efforts. It will be successful in the measure in which you co-operate and to the degree that patriotism takes precedence over profits. The task of organizing the labor market is the responsibility and the opportunity of the employers of this country, and the textile men are exceptional in their qualifications to take the lead in this crisis.

The Hyphen (Szepesi)

(Continued from page 114)

immigrant, ignorant of laws, current wages and values, has a lasting effect, so that later on, when he gradually drifts into American labor conditions he cannot get away from his original experience and offers decided hostility toward all attempts at approach. Present conditions are really a culmination of many years of wrong policy in handling this element. The pressing need of labor, with the very indefinite status of future immigration, will oblige our manufacturing organizations to give personal interest to the Americanization of the immigrant.

A DEBIT; NOT AN ASSET

From an economical standpoint an un-Americanized immigrant is a debit, rather than an asset to the community. He is a poor consumer of staples, he is a retarder of progressive civic life, excitable, an easy prey to the unscrupulous labor agitator, and inefficient. The number of this element is alarming. Their condition may be judged by the fact that out of nearly 50 per cent of foreign-born male population of voting age, only four in over one thousand attend school to learn our language and secure citizenship.

There has been an increase of 142 per cent in the number of immigrants ten years of age and over (the maximum being between the ages of twenty and thirty-four) unable to speak English, and illiteracy has also grown tremendously. That the progress of an industry depending upon this element of labor will be handicapped it is almost needless to say.

In community life this element is plainly undesirable. Their tendency of herding together and their absolute disregard of sanitary and esthetic standards make them unwelcome. They frequent slums, with their filth, disease and vice. Landlords with well-built modern homes refuse to take in this element, which, of course, will house in run-down districts and live under conditions that are pitiful and almost unbelievable. The close observer, who desires absolute justice, will put the cause of such conditions where it belongs: On the immigrant. It is his utter ignorance of American standards and of our mode of living that makes such social abuses possible.

That this statement represents the true conditions has been proved by the fact that American-born workers, or acclimatized foreigners, live better, secure more comforts of life on the same earnings than the foreigner living in the rickety tenements without comforts, and hoarding his earnings for indefinite purposes.

From an industrial point of view this element is very expensive. They increase the accidents, increase the cost of supervision, decrease efficiency, are easily influenced by unscrupulous labor agitators, and increase labor turn-over.

COMPARING THE AMERICAN HOME AND THE OLD COUNTRY HOME OF A LITHUANIAN WORKER IS THE BEST ARGUMENT WHY THE AUTOMATIC AMERICANIZATION OF THIS TYPE OF IMMIGRANT IS IMPOSSIBLE

AMERICANIZING THE IMMIGRANT

Various civic organizations have undertaken vigorous campaigns with more or less success. Boston, Fall River, Lowell, Detroit, Minneapolis, Rochester, and other cities have conducted Americanization campaigns which brought some of this element into the folds of citizenship, but in numbers far from sufficient to have a general influence on the present conditions.

The Y. M. C. A. organizations have carried on illustrated out-of-door lectures campaigns which have reached 200,000 foreigners. What proportion of this element has taken steps to secure citizenship and maintain our standards of living is not known, but the number cannot be large in proportion to the number reached. There must be something wrong in our methods of reaching this element, and there is urgent need for new, effective campaign methods with better results.

THE MAGIC WAND OF AMERICANISM. LITHUANIAN IMMIGRANTS PREPARING FOR CITIZENSHIP, SHOWN AT LEFT. AT RIGHT, THE SAME ELEMENT IN THE OLD COUNTRY HOME

THE GREEK AT HOME THE GREEK IN AMERICA

NOT ALL OF THEM BECOME BOOTBLACKS OR CANDY MAKERS; OUR TEXTILE MILLS ARE FILLED WITH THEM. HERE IS A GROUP USING THEIR NOON HOUR TO BECOME ONE OF US. AN EXAMPLE WORTH WHILE COPYING

Our evening school system of teaching English to foreigners is pedagogical and impractical. As long as we expect an element, whose schooling in most cases was below our most elementary classes, to grasp quickly the monotonous methods of teaching by an American-born teacher, without the slightest idea of the thought of the pupil, all our efforts and money spent for this means of Americanization will bring only very meager results. The night schools are not popular with the foreigner. It is only the most ambitious and the youths who take advantage of it, while the bulk shrinks from attendance, partially from unwillingness to be considered as school-children, and partially because of the pedagogical methods.

A MODEL SCHOOL FOR ALIENS

In the factory of D. E. Sicher & Co. an elementary school is maintained under the auspices of the Board of Education of the City of New York, the workers being taught our language and American standards in a novel and very satisfactory method, and they are probably one of the best authorities to speak on this subject. Dudley Sicher states that night schools can reach but a small portion of illiterates because of lack of iniative and ambition on the part of the foreigner.

In this industrial school for foreign girls the first lessons are purely demonstrative. Instead of a text book, the teacher gives a practical demonstration of American methods of cleanliness by combing her hair, washing her teeth, brushing her clothes and adjusting them with extreme neatness, naming at the same time the article or action, repeating this method until the pupils familiarize themselves with their relation to each other.

The Young Men's Christian Association in Fall River has constructed text-books somewhat on this idea, and, while this method is an improvement over the old one, it is yet far from satisfactory. The text-books relate to the daily life and industrial occupation of the worker, but are unfortunately arranged in the wrong conception that words will find a material association in the minds of the workers. In spite of such handicaps, certain individual mills and communities have obtained gratifying results; proof that Americanization of our foreign labor is not a hopeless proposition. With carefully standardized methods and a greater general interest this evil will be lessened eventually.

ENGLISH CLASSES FOR ALIENS

Sidney Blumenthal & Company, Inc., of Shelton, Conn., employing about 1,800 workers, found that 60 per cent. of their workers are aliens. To lessen this evil they decided in 1916 to start English classes in their mill. These classes were conducted until springtime in the factory lunch room by volunteer teachers. Out of these classes grew a class of citizenship, and forty men from this class took out citizenship papers. While this number represents only about five per cent. of the total number of the foreign element of the mill, nevertheless even this meagre result is a successful demonstration of what might be done if organized attempts were made throughout the industry.

In October, 1916, new English classes were started. The company in the meantime employed a social service secretary, who, together with the Y. M. C. A. secretary, organized and conducted these new classes. Prior to the opening date, notices in the languages of the workers were posted throughout the mill, advising them of this opportunity. Now, 130 pupils are enrolled. The divisions were made according to nation-

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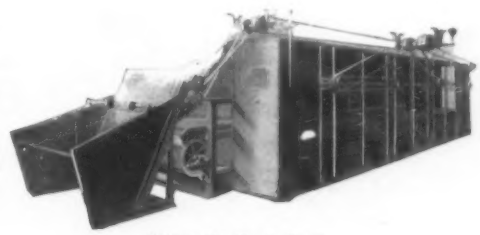

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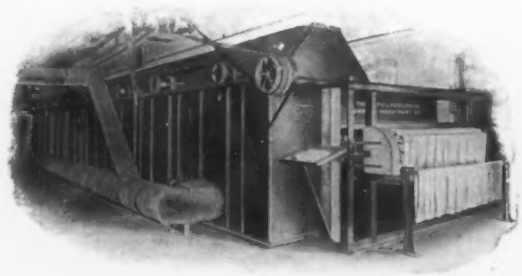

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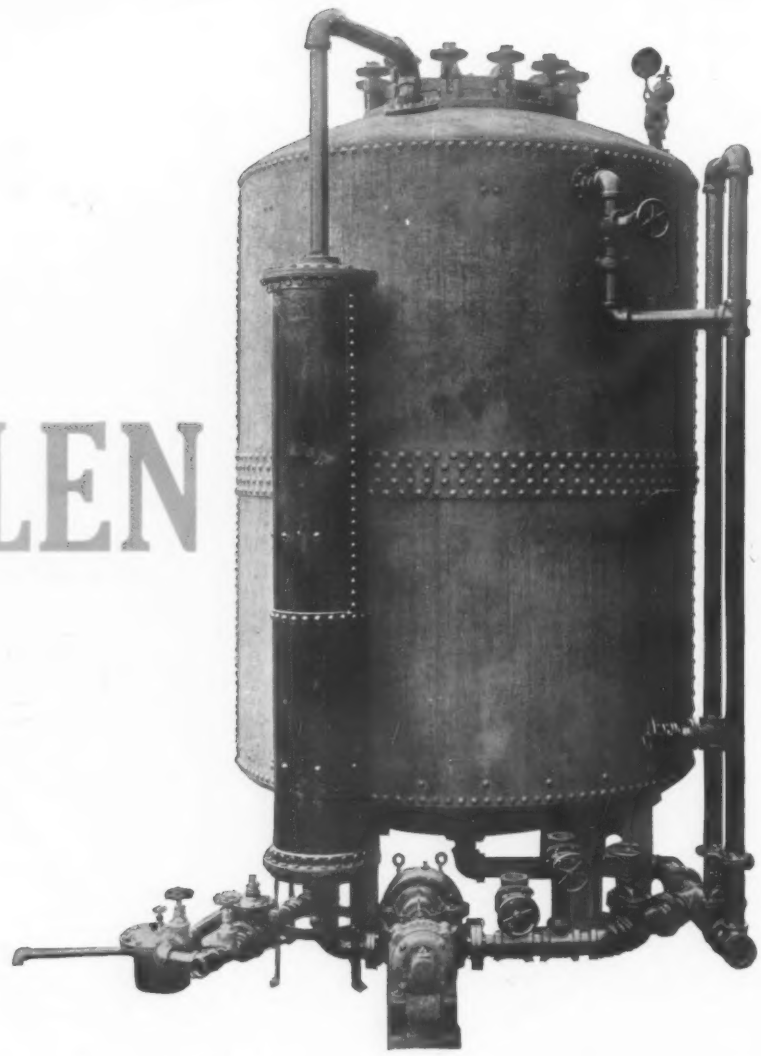

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"Thorough Bleaching—Economically," concisely describes the work of the "Allen Worcester." As experienced mill men know, the "secret of success" in a good Kier is the circulation system. In the "Allen Worcester" the circulation is rapid and even, due to an improved pump, driven either by motor or steam.

Another important feature—no live steam is admitted to the Kier; this keeps the liquor uniform in strength throughout the boil. The materials, workmanship and mechanical details are up to the Allen Standard—assurance enough to men who have had experience with Allen Kiers.

The present is a good time to put your bleaching on an economical basis. *Labor, fuel and chemicals are scarce. The "Allen Worcester" saves them.* Write us for further information.

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WORCESTER **MASS.**

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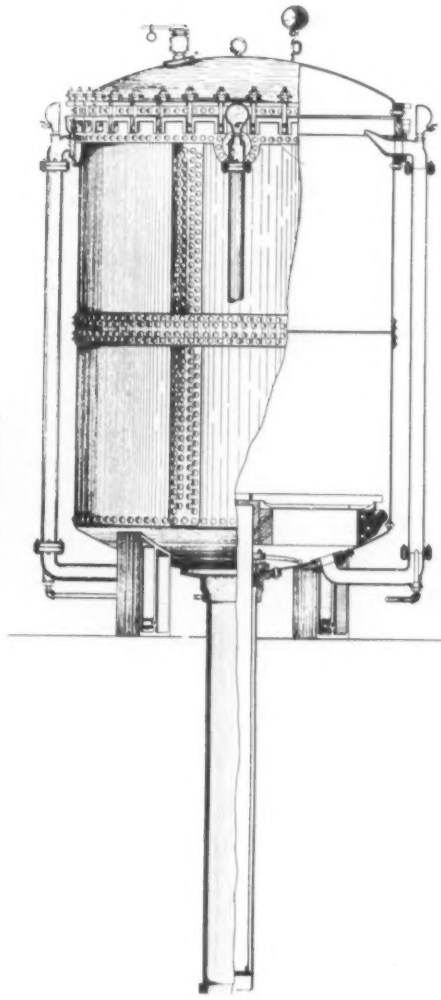

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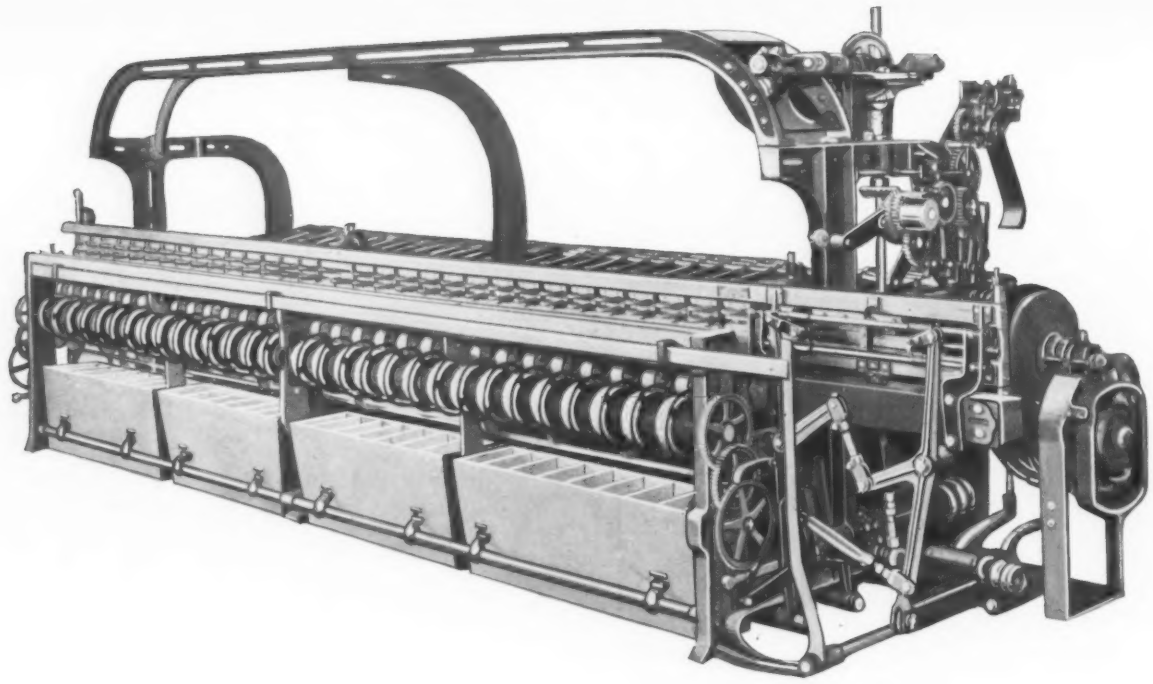

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For the manufacturer specializing in narrow ribbons—plain ribbons and "cheap fancies"—high quality ribbons—fancy Jacquard ribbons—hat bands—novelties in various silks and cottons—there is a type of S & U Loom best suited to your needs.

The cut above illustrates a two shuttle loom used in the manufacture of fancy cotton and silk tapes. It is a tremendous advance in loom manufacturing. High speed—rigid and simple construction—big production—low up-keep. Those are its big points.

Tell us what you want and we will give you information about Ribbon Looms and their operation that will be of great value to you.

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There's an S & U Centrifugal for every drying or extracting purpose. In Textile mills they are used to great advantage in extracting from the goods such liquids as are used in dyeing and bleaching. And in laundries for drying—in factories for reclaiming oil from brass turnings—in tanneries for removing liquid from hides and pelts. In fact there is practically an unlimited field for profitable extraction by centrifugal force.

S & U "Whizzers" are built for long service—strong yet simple. Are operated without necessity for a high priced or experienced man and with an economical use of power, whether driven by belt, motor or individual engine.

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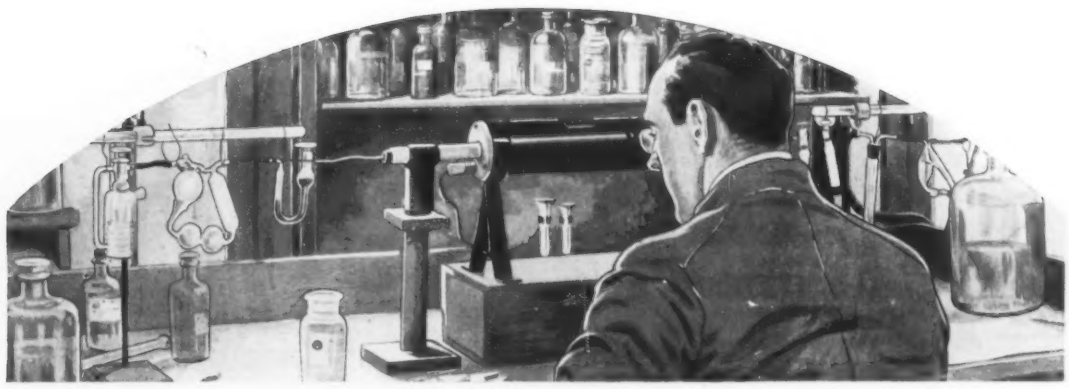

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DO you know the name of the manufacturer (not the dealer), who makes your papers? If not, you are not getting the same protection that you get when buying machines, tools and other equipment.

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ODELL PAPERS

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It is not your first order, in itself, that we desire, but the opportunity of demonstrating our ability to give you perfect satisfaction as to quality, uniformity and price.

For your convenience we have prepared samples in handy form. We will gladly send you a set if you write for them on your business stationery. With them we will send the name of the nearest dealer.

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PULP AND PAPER MILLS—GROVETON, N. H.

ality. These classes lasted until Christmas. By this time a number of the men were able to read and understand a simple English book on civil government preparing them for citizenship. The experience of this organization bears out the truth of the argument presented by many observers: That the teachers of the foreigners should be of their own nationality, because they can better understand the temperament, limitations and abilities of their people than an American-born teacher, and will show greater patience and sympathy.

This management paid a bonus of $6 to each pupil who attended the twenty-four lessons within two months of time. Out of the enrollment of 120 as many as 41 received the bonus at the end of the term. The mill also conducts a shop arithmetic and blueprint reading class, and men who complete this course of apprenticeship in the Shelton Mills' educational school receive diplomas to this effect. During the winter and spring of 1917 the Y. M. C. A. secretary assisted many workers in passing examinations and in securing citizenship papers. Seventy-six foreigners have taken advantage of this opportunity and secured their first papers, while 37 men who attended the classes in citizenship were able to pass that examination and become full-fledged Americans.

Quoting the words of P. L. Gerety, assistant manager of the plant, the mill's efforts were worth while: "Judging from what experience we have had in organizing our alien Americans, we would say the knowledge of English is the biggest factor. Once he has acquired a little English he feels more at home in America and becomes more interested in this country as his home. He is anxious to have a part in civic affairs."

Regarding the best methods of Americanization, he further states: "Again, we must state that the knowledge of the English language is the first step. Give the foreign-born man and woman this key and they will unlock many treasure chests for themselves. They will then understand the things you are trying to teach them. They will begin to feel themselves less the foreigner and more the American."

Judging from the experience of this organization, as well as of many others investigated, the Americanization campaign of foreigners will not be successful and our industries will not develop higher labor efficiency unless the industries themselves take active part in the campaign by organizing citizenship classes in accordance with carefully developed standards.

LESSENS ACCIDENT HAZARD

Many organizations have long realized the high accident list of the hyphenated foreigner, and the Amoskeag Manufacturing Company, of Manchester, N. H., has employed a novel method to combat this problem. In this plant the overseer is required to file a certificate, stating that he personally provided a suitable and safe place in which to work, inspected the machinery and explained the company's rules and regulations to the employes engaged in work. In this mill special care is taken that such instructions are given to every new employe in his own language.

It is hoped that during the coming year we shall see the conferences of the various textile organizations discussing this important problem and assisting in the development of standardized methods that will wipe out the hyphen in America.

Cordage Fiber (Pape)

(*Continued from page* 117)

happy past even that was scarcely needed, for the Mexican "fiber-barons" made fortunes under almost any conditions. Today efficiency is necessary. It is well known that in normal times the fiber industry of German East Africa paid up to 60 per cent profit, and when demand was abnormal as much as 100 per cent has been recorded.

Disregarding the present artificial conditions, which may make a holder of fiber a millionaire over night, it may be stated that in normal times it is good practise to lay down a ton of fiber at $60 to $75, f.o.b., and to realize $125 to $175 at the other end, less about $30 for freight and charges.

Of course these figures are quite ridiculous and inadmissible today. It takes three and one-half to four years to reap the fruits of a fibre planting in the tropics even, and by that time we may be reasonably sure that the "World-Troubler" will have been given his quietus. It is a puzzle, however, to understand how the enormous selling prices of cordage fibers today are justified. Say the initial production cost was double that of pre-war times, or $135 per ton. Even allow that the freight is as much to-day as was the whole cost of the product before the war, or $125, giving a total of $260. Where does the loose balance of $100, more or less, percolate to?

FAVORABLE GROWING CONDITIONS

There is, thirdly, an attractively favorable factor in fiber-growing, due to the fact that the sisal plant is "just about one of the hardiest weeds in existence." It will propagate itself under most adverse conditions, and it is "not subject to any disease or ailment worth noting." Drought it does not fear, because it thrives in semi-arid regions where there is not much precipitation, but it likes an abundance of dew, which is as a rule invariably found in the sections referred to. The sisal plant has a predilection for lime in the soil, and phosphates. These conditions are invarably found in the littorals of a tropical region; abundantly so in the region we have under review.

Plenty of room to expand is one of the prime considerations in such an enterprise for, in the first place, the demands upon the cordage fiber trade are so steadily increasing from year to year that apprehension of over-production is practically eliminated and, in the second place, the scutching capacity of a modern automatic decorticator, or scutcher, are so great that they will absorb the daily leaf-yield from many score of acres. Thus, 2½ tons output of clean fiber per decorticator per day would mean the yield of 12 to 15 acres, and the fields are "cut-over" in divisions, periodically, yielding about 10 to 12 leaves a cutting.

THE PROFIT ON A SMALL INVESTMENT

While fiber growing and exploiting should be undertaken only by men with ample resources, the finances involved are very reasonable compared with the scope and lucrativeness of the business. It would not be judicious to contemplate the acquisition of less than 10,000 acres say, all in one solid block if possible. Since the average up-set price for freehold land of this sort is about $5 per acre, it would mean an initial expenditure of $50,000. In the first year it would mean a planting-up with sisal agave "suckers" (shoots springing profusely from the root-rhysome of the parent plant to the number of dozens annually) of 1,000 acres. Putting down $25 as all-in cost for bringing one acre to maturity is a liberal all-around figure. That involves $25,000, spread over three years; but, meanwhile, subsidiary catch-crops such as peanuts, beans, etc., will be raised between the rows of sisal for two years. A possible 550 acres of peanuts will yield two crops per annum of 300 tons each or 600 tons, which means $10,000 minimum per annum profit. It will be necessary to allow for equipment $25,000. This will comprise two decorticators or crushers at $10,000, power $3,500; railway, five miles, $11,500; tools, contingencies, depreciation, amortization, etc., $10,000. This gives a total outlay in three years of $100,000, of which the sum of $10,000 is returnable by catch-crops, etc. The allowance for working capital need not exceed $30,000.

Soon after the equipment is set up and working there will be an initial return of 850 tons minimum from the 1,000 acres of fiber plants, increasing to 950 tons the second exploitation year and 1,100 tons the third. Allowing $35 net profit per ton of marketable fiber, there will be earned $29,750 the first year, or close to 30 per cent on the money invested.

It is demonstrated, without a nigger in the wood-pile, that there is a safe 25 per cent profit in this industry from the first year, increasing by increments of 5 per cent annually. It is, however, quite possible that good fiber prices will insure a much higher percentage from the outset.

ADVANTAGES RECAPITULATED

It is evident then, in summing up, that this fiber-growing industry has the following advantages:

First.—It is not threatened by overproduction.

Second.—It deals with a product not liable to periodical set-backs.

Third.—It is sure of a steady profit of not less than 25 per cent minimum.

Fourth.—It can be inaugurated with modest finances on a liberal scale.

Fifth.—It is interesting and carried on in a congenial climate.

Sixth.—It is the means of safe-guarding the operations of cordage manufacturers, merchants and many important trades in this country.

CORDAGE FIBER INDUSTRY NEEDS COMPETITION

The emancipation of the cordage fiber market from monopolistic bondage is one of the most vital problems confronting industry today. This "hard-fiber" situation is one of the most flagrant cases of monoply and has loudly and insistently called for remedial measures for years. The curbing of trusts is not the real remedy at all. The trusts are merely the most efficient "live-wires" in commerce, and thrive on a "laissez faire" attitude of the less aggressive portion of the commercial community. Many who condemn them would adopt their practices if they could. The Government is not the one to help. Just as a diffusion of conductors paralyzes the menace of lightning, so a spreading of the sources of supply under independent ownership will nullify the machinations of the unscrupulous. The limit of the feasibility of off-loading the extras on to the consumer is now well in sight for any one who cares to read the signs of the times and of the future.

A LOGICAL DEVELOPMENT

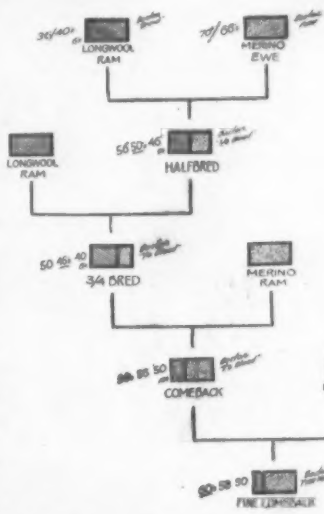
When we contemplate the vital issues concerned, it seems ridiculous to assume that energetic independent action, and at a price which is less than one-half that of a modern spinning mill, for instance, will balk at undertaking measures which are so obvious. The Western Hemisphere must co-operate in solving this problem just as nations on the other side of the water have grouped for common interests and interchange. A good example is the grouping of British, French and Portuguese interests to control the vegetable oil supply of the world in the future. The most important granaries of the world are on our side. We must see to it that we handle them efficiently down to the smallest detail or we shall lose their control and their profits.

Since the shortage of jute and hemp has followed the war-disturbances in Russia, Italy and India, it has been proved that "hard-fibers" may be employed successfully in bagging, burlaps and linoleum foundation manufacture. This insures an immensely wider field for the uses of sisal, pita, aramina and other sorts of fibers indigenous to our hemisphere and a consequently increased demand for the future.

Systematic Crossbreeding (Ritch)

(*Continued from page* 118)

one on the upward. These are the half-bred and the comeback. They are very similar in many respects, only the comeback has a slightly finer fleece and a little more of the Merino character in certain details. If breeders have any ewes of this description they can hold their flock at this stage by using a Corriedale ram. This is the only ram that will keep their wool and mutton close to halfbred year after year. The regular use of Corriedale rams for halfbred and



"GRAPHIC" CHART SHOWING CHANGES AND RESULTS OF CROSSBREEDING

comeback ewes by western flock owners cannot be too highly recommended, because it would result in producing a large quantity of super 56s combing, a very useful and profitable wool both to growers and manufacturers.

THE MOST STABLE CROSSBRED WOOL

After giving a detailed description of systematic crossbreeding, it is also necessary to describe the general character of the wool at each stage indicated on the chart. Turn again to the starting point with the Longwool ram and the Merino ewe; the fleece of the halfbred offspring of this cross is a well assimilated blend of the chief characteristics of the fleeces of the dam and sire. It happens to be the most useful and profitable crossbred wool on the market and commands a good price every year, as it is less subject to sudden fluctuations in price than either the coarser or the finer wools. The spinning counts of the fleece are 56s on the shoulders, 50s on the back and sides and 46s on the britch. This is a true halfbred in the wool trade, and the sheep

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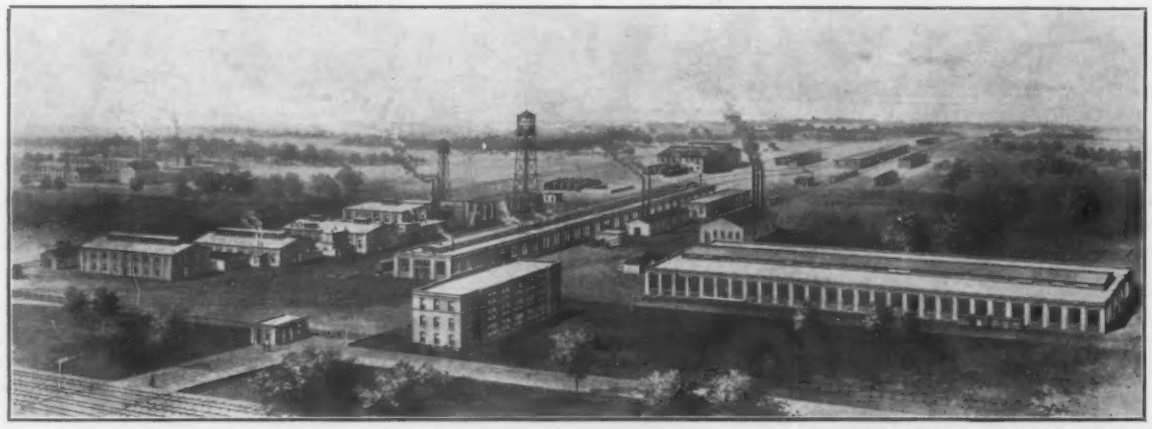

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Scarlet 2R—Scarlet 2RX—Orange II
Bordeaux B—Crimson Y
Bordeaux 2BX—Tartrazine

Chrome Colors
Yellow—Orange—Green—Brown

Basic Colors
Methylene Blue—Methyl Violet

Direct Colors
Orange R—Maroon Red—Red
Chrysamine—Violet R

Lake Colors
Lake Scarlet 2R—Lake Scarlet 2RX
Acid Orange—Bordeaux B
Methylene Blue—Methyl Violet

INTERMEDIATES

Nitro Benzol, Commercial
Nitro Benzol, Redistilled
(Oil of Myrbane)
Aniline Oil
Aniline Salt
Dimethylaniline
Dinitro Benzol
Metaphenylenediamine
Beta Naphthol
Sulphanilic Acid
Naphthionic Acid
Nitro Xylol
Xylidine
Paranitraniline
Salicylic Acid

IN addition to the above we manufacture limited quantities of other intermediates for our own consumption. Also we are developing other items for our own use and on a large scale for the market. On this account we shall be glad to have inquiries from our customers for intermediates not listed above, and we will advise our position on same.

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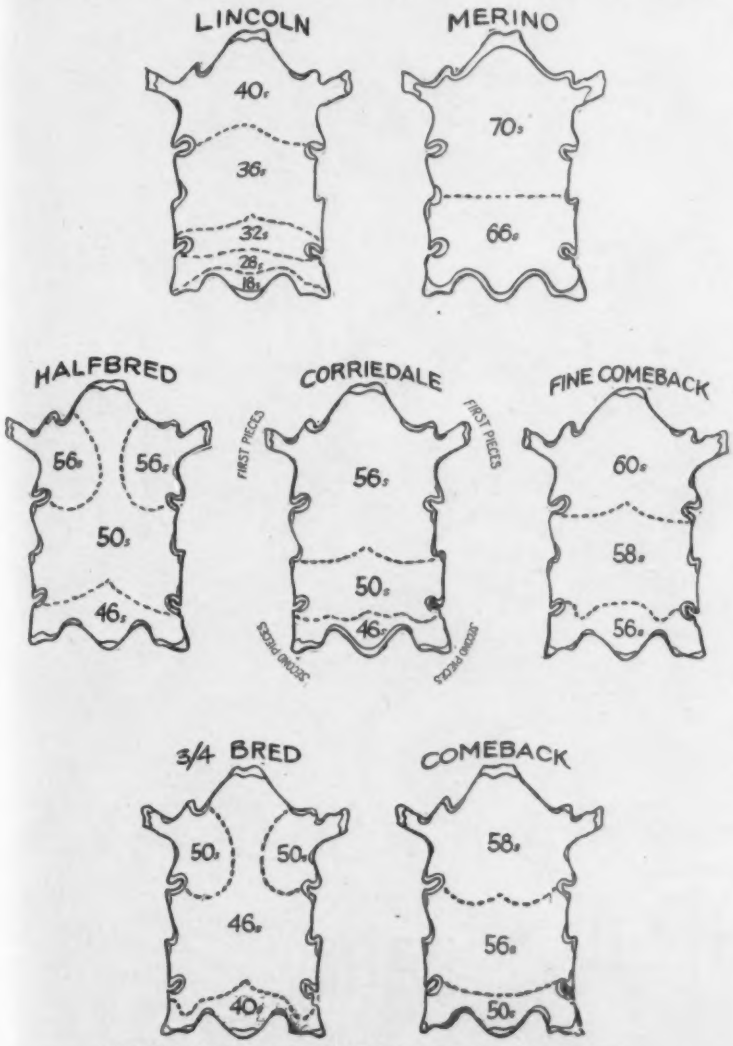
itself is a halfbred according to the rules of crossbreeding, but it is generally called a "three-eighth blood" by wool dealers.

CHARACTERISTICS OF THREE-QUARTER BRED

The three-quarter bred ewe has a fleece possessing more of the longwool characteristics than the halfbred, quite apart from the fact that it is a little coarser. It has a longer staple, but less density so that the weight of the fleece runs about the same as that of the halfbred. It carries less yolk than the halfbred, but the more open nature of the fleece is liable to carry more dust, so that shrinkage is often the same. Lately this wool has been in strong demand, and prices fully equal to halfbred



FLEECE CHART, SHOWING LOCATION OF SPINNING QUALITIES

have often been realized. Whenever the price of this wool is a trifle below that of the halfbred, the difference is fully made up by the extra value of the lamb. Taking one year with another the three-quarter bred ewe is as profitable as the halfbred. The spinning counts of the fleece are 50s on the shoulders, 46s on the back and sides and 40s on the britch. This wool is always classed as three-quarter bred, but it is generally called a "one-quarter blood" in Boston.

THE "COMEBACKS"

The comeback is a little finer than the halfbred, and possesses more of the Merino character. It is also a very useful wool, and worth more per pound than halfbred when scoured, but the shrinkage is sometimes heavier in warm weather, so that there is very little difference to the grower in favor of the comeback. French spinners often favor this wool, but others like the halfbred quite as well. The spinning counts of this wool are 58s on the shoulders, 56s on the back and sides and 50s on the britch, but the greater portion of the fleece in this case runs to the finer count 58s. Comeback is the recognized term for this wool in the trade, and it is also the best descriptive term for the grower, but it is called a "one-half blood" by wool dealers in domestic markets.

The fine comeback possesses the same characteristics as the ordinary comeback, but finer generally. The grease shrinkage is heavier than that of any of the other crossbreds, but the density of the fleece prevents much of the dust getting deep into the wool. Weak and faulty wool over the loins is frequently found on both Merinos and crossbreds grazing on a range containing sand and alkali, and the fine comeback is more likely to suffer from this drawback than other crossbreds after a dry, windy winter. When this wool is in good condition it is favored by French spinners, but it has suffered considerably in popularity during the past six years from the competition of the strong, robust Merino cultivated extensively in South Australia. The spinning counts of the fine comeback wool are generally 60s on the shoulders, 58s on the back and 56s on the extreme britch, the bulk running to 60s. This is sometimes called a "fine medium" in Boston.

A PRIME CAUSE OF DECREASING WOOL CLIP

The irregular crossbreds indicated by the dotted lines, and (?) are merely inferior qualities of the wools already described. They are always more erratic and generally lacking in density and, as "zig-zag" crossbreeding proceeds, the clip gradually gets lighter and the dust shrinkage heavier. Comeback crossbreeding, even on regular lines, should be strictly limited. When overdone it often leads to unprofitable "throwbacks" of a nondescript character. What may be called "zig-zag" crossbreeding is unfortunately carried on, to a large extent, in the range country of the western states, and this is accountable for the large quantity of inferior crossbred wool produced. If the sheepmen on the range would replenish their flocks by buying more pure bred Merino ewes, and fewer Meriono rams, their crossbred flocks would be much superior and far more profitable than they are at present. Those who do not feel inclined to run a few pure bred Merino ewes for producing profitable halfbreds should buy a few good halfbred ewes every year. In either case they would get better results than they do now by using Merino rams too often with the mistaken idea of getting back to something near a halfbred or high three-eighth blood.

Sheepmen on the range would also find it easier to produce more wool of a halfbred character if they used more Romney and Leicester rams and fewer Cotswolds and Lincolns. When systematic crossbreeding is regularly practised, Romneys and Leicesters will be more extensively used, especially the former. Intelligent methods of wool production will also result in the extensive use of the Corriedale in many districts throughout the western states. Commencing with better sheep and following systematic methods of crossbreeding, would result in improving the quality of the wool and increasing the average clip by two pounds per head. This has been done in other countries, and it has been done recently in Wyoming to a limited extent. The development of a more robust Merino wool with a longer staple and lighter shrinkage should also receive more attention from western breeders.

The seven fleeces on this chart represent a Lincoln and a Merino, and also the fleeces of their crossbred offspring (four generations) according to the average results of systematic crossbreeding. The seventh fleece represents a Corriedale for comparison. When the system described is carefully followed variations are very slight. The results produced by the various breeds of Longwooled rams are very similar, the Leicester producing finer wool on the extreme britch and the Cotswold coarser wool on the hips, while the Romney produces denser and finer wool generally. This difference in the latter, however, is not sufficient to alter the spinning counts to any extent beyond decreasing the area of the finer sections of the fleece.

The fine line just inside the edges of the fleeces indicate the "skirting," not the proportion usually removed from the fleece in the shearing shed, but the position in which seedy, stained and damaged pieces of wool are found when the fleece is spread on the wool table. When a crossbred fleece is free from burrs, the amount of skirtings is infinitesimal, possibly two to four ounces according to condition. When the fleeces are not skirted, the stained wool injures the main fleece when pressed into the bale, and therefore depreciates its value in the sale room.

The dotted lines indicate the location of the various sorts or qualities in each fleece, and the figures denote the estimated spinning counts. The spinning count on different sections of the fleece is the size of spun yarn which the wool is expected to produce. Of course, the finer wool is capable of being spun into a finer yarn, consequently it is more valuable when scoured. It should be the aim of every wool grower to cultivate the extension of the area or section of the fleece producing the higher spinning counts, because the fine wool is not only more valuable, but it also grows more densely, thus giving a greater weight of clean wool. Although it is an advantage to cultivate an extended area of the finer fibers, it is not wise to cultivate an unnaturally fine wool on any breed of sheep. Supposing the shoulder wool of the halfbred spun 60s and the back 50s, that would be an irregular fleece and, it would otherwise be found defective in some form or other. When wool is classed in the shearing shed, the classer is guided by the predominating quality—that is, the spinning quality of the largest section, or area, of the fleece, and that determines the bulk average or grade.

This illustration of the average spinning qualities of the various fleeces was originally prepared for the information of wool growers, to enable them to realize the importance of giving more attention to systematic crossbreeding, with the object of producing more wool of a better quality without any additional expenditure. Beyond that, the various spinning qualities in one fleece do not concern them, because the different sections of each fleece are only divided in the mill. That process is called sorting or "matching," and it should never be confused with classing in the shearing shed, which does concern the grower.

A careful study of the elementary principles of wool growing, packing and marketing on the most advanced methods is essential for the prosperity of the industry, therefore it ought to receive more attention from growers and manufacturers.

Foreign and Domestic Wool Terms

These and Spinning Equivalents Tabulated Descriptive of Modern Wool Classing in West

By *W. T. Ritch, of American Wool Improvement Association*

IN all the large up-to-date shearing plants in wool-growing countries south of the Equator, wool is carefully classed or "graded" after it leaves the hands of the shearer. This classed wool is baled and branded ready for the auction sale so that it does not require to be handled again until it reaches the sorting room in the mill. The only exceptions to this rule are the flocks of small farmers and new settlers in Australasia and a few backward sheep raisers in South America and South Africa. As the same system has been established in various parts of the intermountain states during the past three years, and merely adapted to suit local conditions, a comparison of the different terms and their equivalents is now possible with domestic wool.

CLASSING CANNOT INCREASE THE NUMBER OF GRADES

Classing is merely a more thorough and a more advanced method of grading, therefore it does not affect sorting in the mill to any extent beyond making

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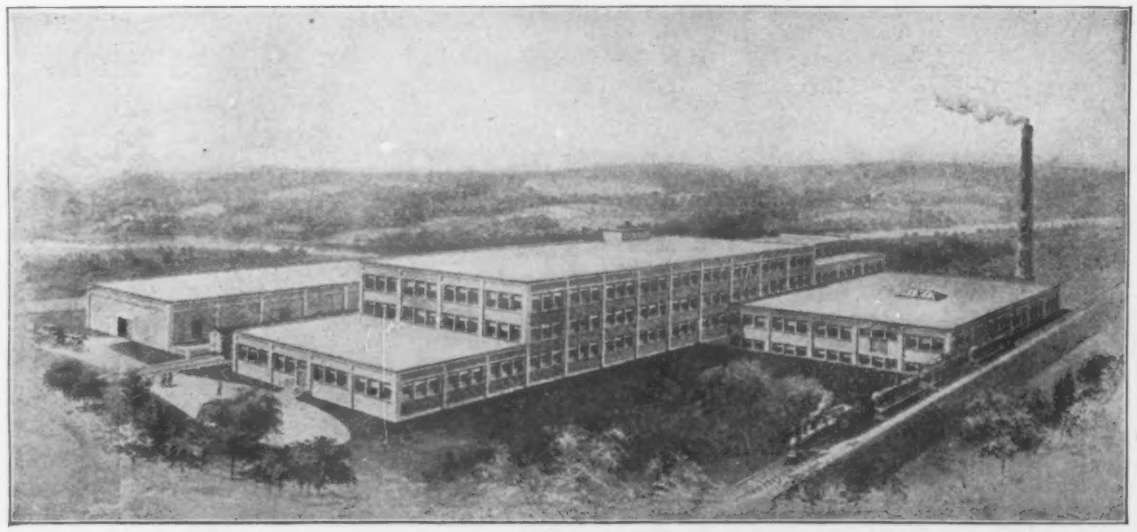

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that particular operation easier in all cases, and slightly less expensive in a few cases. When this system was first introduced in the Western States it was misrepresented to such an extent that a few manufacturers got the impression that additional grades were made. The chief object of the following tabulated equivalents is to correct any wrong impressions which may still exist, because the creation of fresh grades would be as absurd as trying to make forty inches to the yard instead of the standard thirty-six. As already stated, the international grades have different terms but the number of grades are exactly the same, because nature cannot give any more and spinners would not tolerate more.

WHY BRANDED DESCRIPTION IS NEEDED

When wool is correctly classed, baled and branded in the shearing plant, it is necessary to give full information in the branded description because the wool is sold in the bale and not in an open pile. One or two sample bales in each grade is opened for the buyer's inspection and the contents of the remainder are guaranteed to be the same. Now every grade contains wool shorn from old ewes and yearlings, therefore ewe wool is marked "Ewes" and yearling wool is marked "Hoggets" in addition to the name of the standard brand. This is necessary for two reasons: First, because the tip of the staple of a yearling fleece (never shorn before) has a different appearance, and second, because the yearling wool has a tapered fibre in addition to being more elastic, therefore it can generally be spun to greater advantage. As old ewes and yearlings are always run in different bands to the shearing shed and shorn separately no extra trouble or expense is caused in packing their wool in separate bales.

ADVANTAGES OF SLIGHT SKIRTING.

Belly wool is shorn in one whole piece separate from the main fleece, graded and packed separately. Skirting in new shearing sheds in the intermountain states is very slight because the wool is nearly always free from burrs, so that nothing but small fragments of stained and seedy wool requires to be removed. Stained wool plucked from the forequarters of the fleece is called First Pieces, and stained wool plucked from the hind quarters is called Second Pieces. All wool accidentally broken from the fleece by the shearers is not swept up and rolled inside the fleeces, as is customary in old fashioned shearing pens, but carefully segregated on the piece pickers tables and classed amongst the First and Second pieces. Skirting in modern shearing plants in the Western States should not be confused with the deep skirting necessary in burry districts in the Southern Hemisphere, neither should it be confused with what is known as removing the "skirts" in the sorting room in the mill. Before the skirted fleeces are rolled up and placed on the wool classer's table, all the loose dust is carefully shaken out. Over ten per cent. of the dust shrinkage is eliminated in this way over the revolving slatted rollers of the skirting table.

The light in the wool rooms of these modern shearing plants is as near perfection as possible, and much superior to many of the wool warehouses in the East. No unskilled laborers are employed in the wool rooms, as the work is performed by specially trained University students who work under the direction of the wool classer. The other work in the shed is supervised by a competent manager because the flockowners are never allowed to handle their own wool or interfere with the slightest detail. Full information is given every wool grower regarding his clip and also instructions for improving his wool in future.

"ROUGH GRADED" WOOL IS NOT CLASSED WOOL.

When the improved system of preparing wool for market was first introduced in the intermountain states all the wool classers were brought from Australia and New Zealand, but most of this work is now performed by eastern mill sorters, who are equally satisfactory after one season's practice. Unfortunately misunderstandings have occurred through some flock owners attempting to rough grade their clips in old fashioned shearing plants, with eastern graders and untrained help, consequently baled wool of this description has been confused with the classed wool already described. A seal is now being placed on all bales of wool classed in the modern shearing plants to prevent any wrong impressions in future.

It is impossible to class or grade wool satisfactorily in old western shearing pens. A new plant must be built expressly for this work, and great care is necessary in training the wool room help. These new plants are carefully designed so that all unskilled labor is unnecessary and the saving thus effected, along with increased output and good organization, is sufficient to cover the cost of the skilled help, so that the new system of shearing and packing does not exceed the total cost of the old, careless method. The enhanced value of the wool is a decided advantage to the grower, yet that advantage is small compared with the improvement of his sheep and the quality of his wool after two or three seasons of the new system.

TABULATION OF TERMS

The following is a copy of the tabulated explanation of the various grades representing the domestic terms, the international, and the comparison of Boston and international terms with the worsted spinning counts or qualities:

COMPARISON OF GRADES

Boston Grades.	
Description.	Smallest fragments of inferior wool and sweepings.
Braid	Wool from Pure Cotswold or Lincoln Ewes.
Low ¼ Blood	Nearly Pure Cotswold or Lincoln. Supposed to be ¼ Merino Blood.
¼ Blood	Wool from Crossbred Ewes containing ¼ Merino Blood.
⅜ Blood	Wool from Sheep supposed to be ⅜ Merino Blood.
½ Blood, Staple	Wool from Sheep supposed to be half Merino Blood. (Combing.)
½ Blood, Clothing	Short wool from Sheep supposed to be half Merino Blood.
Fine Medium, Staple	Long wool from pure or nearly pure Merino Sheep. (Combing length.)
Fine Medium, Clothing	Short wool from pure or nearly pure Merino Sheep.
Fine Staple	Superfine Combing wool from pure bred Merino Sheep. (Occasional.)
Bucks, Fine	Wool from Merino Rams.
Bucks, Braid	Wool from Lincoln or Cotswold Rams.
Black	Wool of any grade from Black Sheep.
Tags	Every kind of broken pieces and Tags swept from the floor.
Locks	Smallest fragments of inferior wool and sweepings.

Note.—Belly wool in old-fashioned sheds is shorn attached to the fleece and remains so until separated by the mill sorter. "Fine Staple"—only a limited quantity is found in Territory Wools, frequently not sufficient for a separate grade. Half Blood Clothing is rapidly decreasing owing to improved breeding and also to improved combing machinery.

WOOL CLASSING

Explanation of International Standard Terms

Class.	Description.
⅝ Bred, Strong (Occasional)	Wool from Crossbred Sheep shoring over ⅝ Coarse Lincoln characters. Bulk 44s.
⅝ Bred	Wool from Sheep ⅝ Lincoln and ⅛ Merino, average character. 46s to 50s.
Halfbred	Wool from Sheep ½ Lincoln and ½ Merino. 56s.
Comeback	Wool from Sheep being offspring of ⅝ Bred Ewe and Merino Ram. Bulk 58s.
Merino, Combing	Merino wool of combing length, quality and strength. Average 66s.
Merino, Clothing	Short Merino wool of true clothing quality. 66s.
Rams, Merino	Wool from pure bred Merino Rams of sound Combing length and quality. 60s up.
Rams (Lincoln)	Wool from Longwooled Rams, the name of the breed being branded on each bale. Bulk 36s, 40s.
Black (Crossbred)	Wool from Black Sheep, Merino or Crossbred, branded on bale.
Bellies (Merino or Crossbred)	Belly wool, shorn whole and separate from the main fleece, graded and packed separately.
First Pieces (Merino or Crossbred)	Small pieces of discolored, seedy or damaged wool plucked from forequarters of fleece, and also selected pieces accidentally broken off by the shearers.
Second Pieces (Crossbred)	Small pieces of discolored, seedy or damaged wool plucked from hindquarters of fleece, and coarse pieces accidentally broken off by the shearers.
Locks	The smallest fragments of inferior wool, swept from beneath the tables and the dust shaken out.
Tags, or Stained Pieces	Dung tags and also urine stained wool picked from fleeces, bellies and broken wool.

Note.—Wool from pure bred longwooled ewes is branded with the name of the breed, such as Lincoln, Cotswold, Romney, etc. Ewes and yearlings are shorn separately and their wool is packed separately; bales containing the former are branded "Ewes" and the latter "Hoggetts."

Two qualities are sometimes made in a few of the better grades in large clips, but never in small clips. These two qualities are either marked AA and A or First and Second. This method usually enables the clip to command a higher average price, and it always reveals breeding results to the grower, therefore it helps him to improve his flock every year.

Full information in branding does not increase the number of grades, but it conveys important information to both the grower and manufacturer, besides making the work of the mill sorter easier and more accurate. A careful segregation of the broken wool prevents waste, commands the confidence of the buyer, and enhances the value of the clip.

EXPLANATION OF WOOL TERMS

(*Equivalents*) International Terms.	Spinning Counts.	Boston Terms.
	36s to 40s	Braid.
Strong ⅛ Bred (Occasional)	40s to 44s	Low ¼ Blood.
⅝ Bred	46s to 50s	¼ Blood.
Halfbred	50s to 56s	⅜ Blood.
Comeback	58s to 60s	½ Blood, Staple.
	58s to 60s	½ Blood, Clothing.
Merino, Combing	64s to 74s	Fine and Fine Medium Staple.
Merino, Clothing	64s to 74s	Fine and Fine Medium Clothing.
Rams, Merino	64s to 70s	Bucks, Fine.
Rams (Longwool)	36s to 44s	Bucks, Braid.
Black (Crossbred)	46s to 58s	Black.
Tags or Stained Pieces	36s to 58s	Tags (Mixed).
Locks		Locks.
Bellies (Merino or Crossbred) First pieces (Merino or Crossbred). Second pieces (Merino or Crossbred).		(None.)

The International equivalent of "Braid" is the name of the breed of sheep which produced the wool. The same rule applies to all Longwooled Rams, the name of the breed being branded on the hale of wool, such as Lincoln, Leicester, Romney or Cotswold. There are exactly the same number of "Grades" in each system of classification and branding. The equivalents, however, should be regarded as approximations because grading in Boston and Philadelphia sometimes varies a little owing to market fluctuations and changed local conditions. Foreign wool is always classed in accordance with the predominating spinning count in each fleece.

Wool Prices Maintained

PHILADELPHIA, PA., Jan. 7 (*Special*).—"The dominating factor in the wool market and in the wool textile industry during the current year will be the United States Government. Its requirements for military and naval purposes will undoubtedly be enormous and will tax the productive capacity of all mills adapted to making war goods. Civilian requirements will undoubtedly and readily absorb goods produced by mills not engaged on Government work. This whole situation will operate to maintain wools at a high level of prices. The business of the nation is to win the war; to this end it is necessary to organize and co-ordinate all factors to obtain the greatest possible efficiency and economy in production and distribution. To obtain this it may be necessary to have Government control and regulation. If such is the case it is to be hoped such action will be under the advice and direction of the best practical brains of the trades affected, in order to obtain the efficient operation of the business organization and financial resources now in existence. The great need today is co-ordination, expert management and unselfish patriotism. Real patriotism ignores profit and politics."

A. C. BIGELOW,

Pres. More-Sheep-More-Wool Association.

Conditions in Bag Trade

BOSTON, MASS., Jan. 7 (*Special*).—"The outlook for 1918 in the particular branch of the textile industry in which I and my associates are engaged, which involves particularly cotton goods of a coarse nature and jute goods for the packing of materials, chiefly food and foodstuffs, based upon the assumption that the war will be protracted indefinitely, would mean that at least through 1918 undoubtedly the demand will continue active. The cost of raw materials and supplies and resulting prices will continue high. With the increasing shortage of labor and at the same time demand therefore resulting from the war it will be difficult to maintain production on the present schedule. It is probable therefore that business will continue active through the year, but accompanied by continually increasing difficulties and risks in manufacturing and merchandising."

ALBERT FAREWELL BEMIS,

President, Bemis Bros. Bag Co.

Weaving Machinery Flourishing

WORCESTER, MASS., Jan. 7 (*Special*).—The outlook for 1918 in the weaving end of the textile industry looks very flourishing, and makes one optimistic of the future, if the war is protracted indefinitely. The principal trouble at present is the transportation situation and the shortage of cars is increasing daily. The draft has affected us to a considerable extent, and a great many of our employes have enlisted voluntarily. We look for a further rise in various commodities to be used in the manufacture of weaving machinery, and the shortage of labor by spring time will become very acute. The coal situation is very bad at the present time, and we do not see how it can be very much relieved in our section for some months to come.

L. J. KNOWLES,

President, Crompton & Knowles Loom Works.

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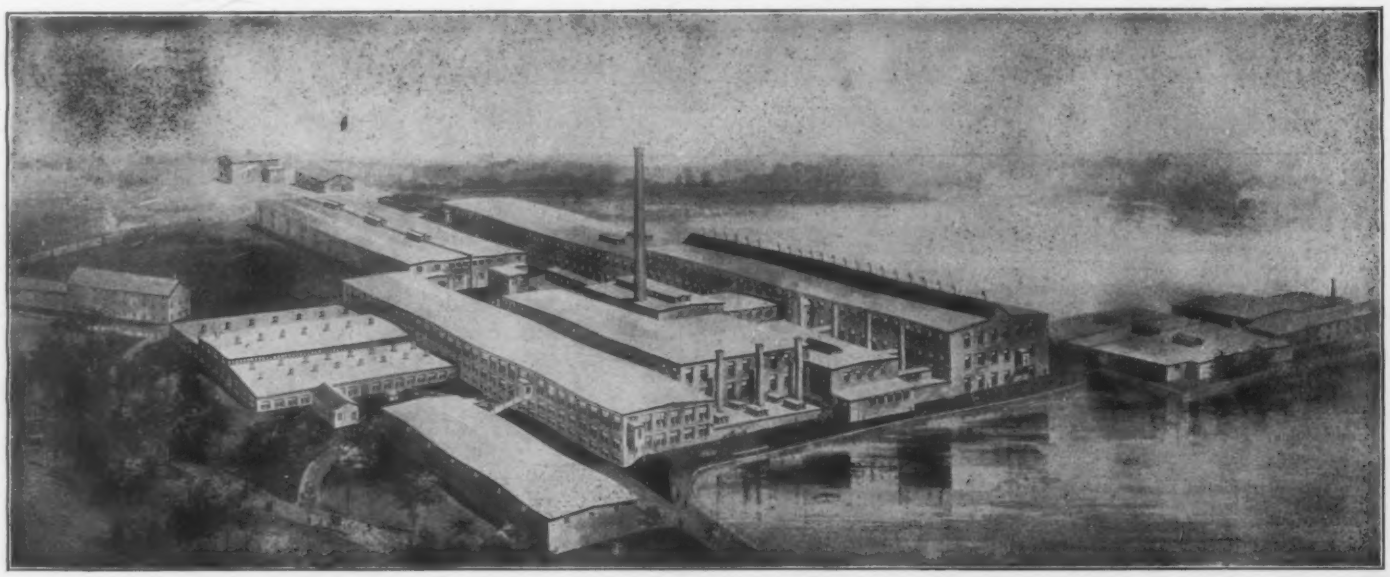

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ALL GRADES WHITE COTTON FABRICS

PIECE MERCERIZING

Dye, Bleach and Finishing Technical Section

Leniency in Requirements for Olive Drab

Tests Before and Since War—Ultra Violet in Dye Fading—Stock, Yarn and Piece Dyeing

By *E. W. Pierce* *

THE shade which represents the most popular color of today is not new in any sense of the word, but is an adaptation of a style that has been more or less popular for many years, particularly in men's light overcoat goods. The standard heavy shades, black, navy blue and brown, readily lent themselves to mixing with white stock and the resultant oxford, cadet blue and drab are probably the oldest shades to be found in fabrics.

In standardizing the color for military purposes, account has been taken of both the low visibility and freedom from contamination by the dust and dirt, which was enjoyed by the khaki originally used by the British troops on their cotton uniforms in India. The very name khaki has reference to its resemblance to the earth in color. As a solid shade it cannot be considered attractive and the many difficulties in the way of obtaining a fast, level piece dye at the time of its first adoption have, no doubt, had much influence in the choice of a mixed fabric.

The shade at present seen in the uniforms of the privates is much too yellow to conform to either the Government standard or good taste. The need of the materials, the leniency of the various quartermasters, and the scarcity of certain dyes, is responsible for this departure from the proper shade of color. The production of this extreme yellow tone, which becomes still yellower during wear, causes a great loss in the low visibility feature, which is a character of the proper color.

While much latitude was permissible during the early days of our preparing, because the dyestuff situation was the determining factor, there is not so much excuse now since a number of American factories are producing dyes that will meet all the necessary requirements. There is a real obligation for the manufacturers of fabrics for the use of the army to produce standard goods for several practical reasons. The sight of a body of troops with a variety of colors in their uniforms detracts from their appearance and, while not a fatal defect, is not to be commended. The difference is not sufficient to produce an effective camouflage, while the sight of a man with four contrasting colors in his coat, trousers, blouse and overcoat, and sometimes blanket, makes the word "uniform" somewhat of a joke.

There is a standard shade for olive drab, the means of producing it from all-American materials now exist, any mill equipped for dyeing wool stock can obtain the proper shade and fastness, even if they have only open kettles worked by hand. There is no reason why the production of anything so essential for the equipment of our army should remain a monopoly for either dyestuff manufacturer or woolen mill operator. All the facts regarding the dyeing of this important shade should be public property in order to facilitate production. The small mill that has been running on shoddy goods may be able to do its bit with but little additional equipment if the dyer can get necessary information, and the small dyestuff factory can make important contributions if an outlet is provided.

Before the war all the American branches of the large German dye factories maintained a force of demonstrators, who worked out the mill dyehouse problems, apparently without charge. The elaborate sample cards, and instruction books, and ready-mixed-matched dyes did much to prevent the development of that initiative and reliance on the part of the dyer, which was a noted characteristic of the past generation. Under these conditions olive drab became somewhat of a monopoly, and under the old specifications the available dyestuff was narrowed down to one source of supply.

TESTS PRIOR TO WAR

We will pass over the specifications regarding stock, tensile strength, weight, etc., and confine our attention to the color tests. Prior to the war there were prescribed the following tests, and each lot submitted was expected to stand as well as the standard sealed sample furnished by the quartermaster.

Soap Test—The sample is to be boiled for ten minutes in a solution containing 80 grains of Ivory soap in one pint of water, then rinsed in pure water and dried.

Soda Test.—The sample is to be boiled for ten minutes in a solution containing 10 grains of dry carbonate of soda in one pint of water, then rinsed and dried.

Lactic Acid Test—The sample is to remain immersed in lactic acid, U.S.P. (75 per cent.) for 24 hours, then rinsed free of acid and dried.

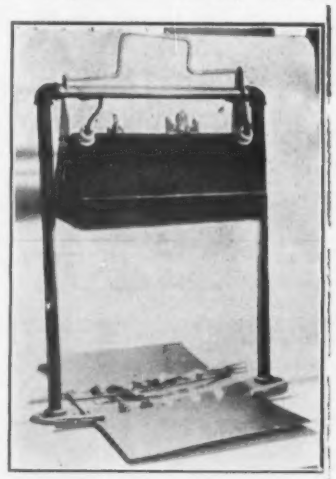
Citric Acid Test—The sample is to remain immersed in a citric acid solution, which was about 10 per cent. strength, for 24 hours and then rinsed and dried.

Light Test—The sample is to be exposed to the sun and weather for 30 days.

While the wording of these specifications does not follow the original exactly, the substance is the same. It is also understood that a different sample is used for each test and not one run through the whole series.

We can readily appreciate that the first two tests were intended to represent washing conditions, severe even for an army, in case the fulling and scouring in the mill had not been sufficient to remove the color or alter the shade. The two acid tests, however, are masterpieces. The citric acid was supposed to imitate the action of fruit juices in the tropics, and the lactic acid, it is said, represented perspiration. Both of these tests converted the wool itself into a hard pulpy mass that required a great amount of washing to restore its flexibility, and all dyes having a red element in their shade were decolorized, excepting Chrome Fast Reds G and R.

All the true alizarine reds, which were so much faster to light and washing, lost their color in a few hours and were not permissible under these tests. Some ordinary acid reds, which had no fastness either to light or ordinary washing, would stand the two acids indefinitely. Many reddish-toned chrome browns and all the chrome reds, except those mentioned, were more or less decolorized and caused the test to assume a greenish tone. In times of great need for the goods it was sometimes possible to use a few substitutes and have the goods passed, but the requirements were adhered to as closely as possible by the quartermasters. Shortly before the war a new standard was adopted for meltons, which, it



APPARATUS FOR DYE FADING

was said, was dyed with vat dyes. The writer, having no first-hand knowledge of these goods, can make no further comment than to state that if the war had not cut off the supply of dyes and such a high standard had been insisted upon, we would have been entirely barred from the use of American dyestuffs.

Of course, we all feel that our soldiers should have the most serviceable goods obtainable, but when requirements are introduced that make the goods more expensive and necessitate dyeing processes that give colors that will long outwear the fabrics themselves, we naturally inquire for the reason. If the specifications bar all bidders on the contracts except a few, and such exclusion is not based on real merit, but on a technicality that involves the use of a proprietary dye that is not even made in this country, the answer to the inquiry is obvious.

REQUIREMENTS MODIFIED

Naturally the demand for olive drab goods of all descriptions, and the acute dye situation made it necessary to modify the requirements so the demand could be met. The two acid tests have been dropped and it is now possible to produce faster colors in the more essential requirements by allowing of the use of a wider range of red dyes. Nothing has been lost and whatever monopoly may have existed before need continue no longer. The soap test has also been changed slightly, but not materially, by the substitution of oleine soap, army issue, for the Ivory soap.

The tests are easily carried out in small enamelled saucepans on a gas stove, using pieces of goods about 3 inches square. In some departments the shrinkage of the goods is asked for. This test is included in the soap test by cutting the sample exactly 100 millimetres square, and after drying flat, measuring the shrinkage in both directions of the goods. This gives the shrinkage in per cent. without calculation.

FADING BY ULTRA VIOLET

The light or exposure test is necessarily a very variable and uncertain test at the best and we are glad to see that now there is a stronger movement in favor of the ultra violet exposure, some of the Government departments, at least, having recognized its value and saving of time. The opposition to ultra violet rays as a substitute for sun and weather are prepared to show that many dyes vary in their fading by both methods and that no exact ratio is possible for all colors. These facts cannot be disputed, but the same reasoning applied to sun and weather would lead to still worse confusion. The sun gives out with its light and heat a certain assortment of short rays in the ultra violet region of the spectrum, which do not pass through glass, cannot be reflected nor refracted, and which act on moist air, producing oxone, oxides of nitrogen and hydrogen peroxide. The intensity of the sunlight and the relative humidity, varying from day to day, make an exposure test a very irregular matter. We can never tell whether the loss of color, which we call fading, is due so much to molecular disruption from the short rays of the sunlight as to a real bleaching action or oxidation. A comparison of a dry sample under glass would also give uncertain results as most of the active rays are kept out by the glass.

Ultra violet rays, produced by an effective apparatus, on the other hand give an assortment of short rays that may differ from the sun's assortment just as the light from a mercury vapor lamp differs from gaslight. The quality of the rays do not differ but there is a somewhat different proportion. Work is under way at present toward the charting of the short invisible rays, which cover quite a distance beyond the last visible violet, but until we get more information the work of testing fastness to light will be somewhat empiric.

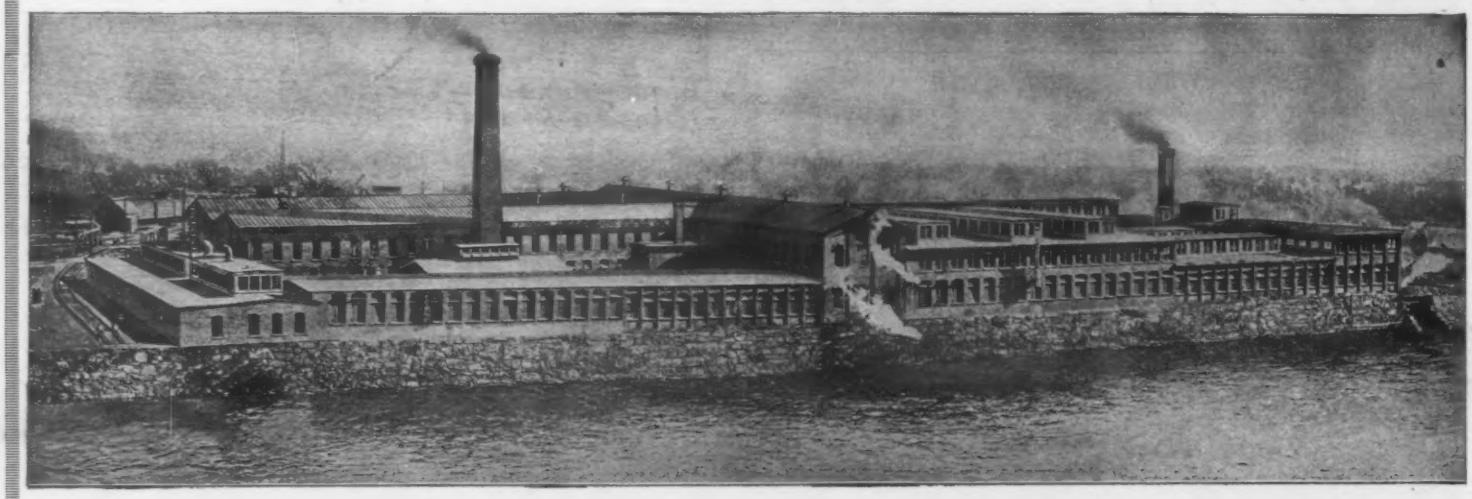
The fact remains that the short rays do fade dyes, that the source of light, moisture and time can be exactly controlled and, having once exposed a standard, subsequent tests can be subjected to exactly the same conditions. As the sample soon becomes dry all action of the bleaching agents may be disregarded. Having once determined what is a satisfactory period of exposure this can be repeated with new samples at any time.

A description of a satisfactory form of apparatus will be in place here. The lamp proper, which is covered by the hood, is a tube made of transparent quartz, made ¾ x 7 inches, with a well or depression at one end, containing mercury and a perfect vacuum be-

* U. S. Conditioning and Testing Co.

FARWELL BLEACHERY

Mills: Lawrence, Mass. Executive Offices, 70 Kilby St., Boston, Mass.



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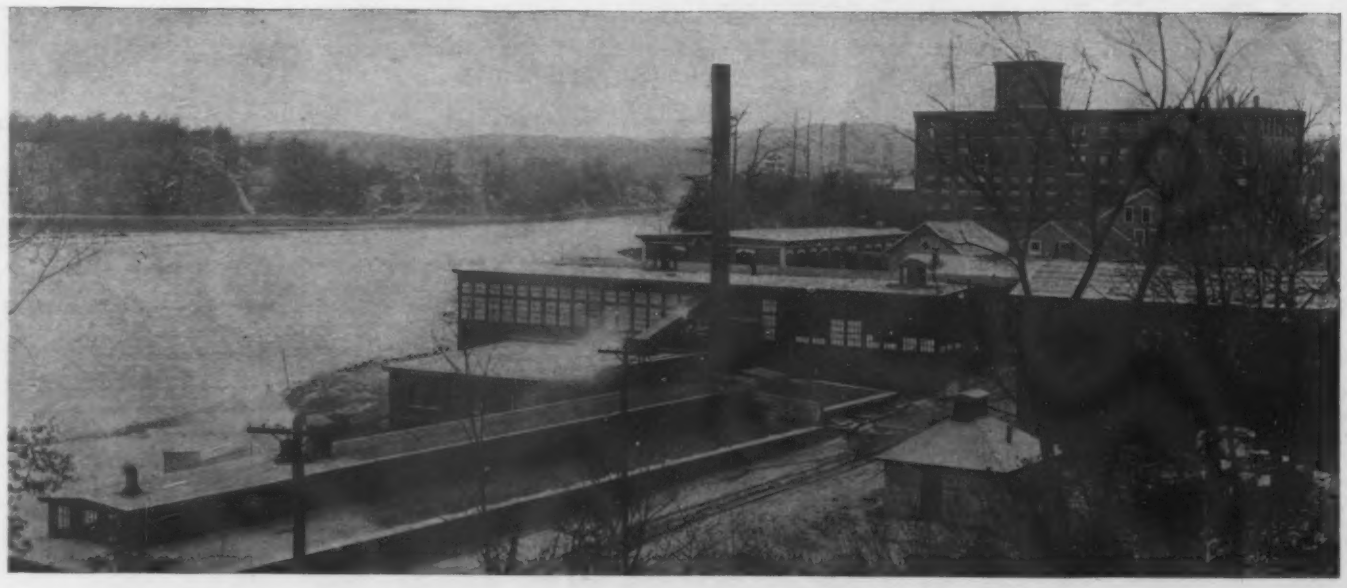


DYERS, BLEACHERS and MERCERIZERS of COTTON YARNS

IN WARPS AND SKEINS

ABSOLUTELY FAST COLORS

ing necessary to perfect operation. The leading in wires and anodes are tungsten, but otherwise the operation is similar to the ordinary glass mercury vapor lamps used by photographers and others. This lamp is on a 220-volt circuit, but when in operation registers about 170 V., 3½ A. There is a great increase in the number of short rays at this higher voltage and while the ordinary lamp used by physicians can be viewed by the naked eye, a lamp of this type will cause, in one second, an acute inflammation of the eyes lasting three days. Fifteen seconds exposure of the face, with the eyes protected by amber glasses, caused a reddening of the skin to develop several hours later, which was identical with sunburn.

The samples to be exposed are about 18 inches below the tube and must be protected by metal, as the rays penetrate slightly through cardboard. White wool is somewhat yellowed and the regular mixture for olive drab loses its mixed appearance during exposure as the white changes. From a number of tests it was computed that the exposure under the lamp shown had a value very close to eight times that of sunlight, or roughly one hour under the lamp equalled an average day's exposure. However, in such tests as have been ordered by Government departments, the orders have been for 48 hours' exposure, which will fade the majority of dyestuffs.

If the ultra violet exposure is to be made an official test, it will be necessary to standardize it more closely. All lamps differ in power according to the voltage supplied and to the automatic resistance in their control. As the lamps age, the devitrification of the quartz, the deposit of tungsten oxides, and the loss of vacuum by leakage, cause a lessening of the radiation. These features are being studied now at several laboratories and the results will have much to do with making this an official test. As there is a great difference in the power of different lamps at the outset, and as all lose some of their intensity by constant use, it can be easily seen how much variation is possible in comparing the work of several observers. As soon as we are able to measure ultra violet radiation it will be possible to compare results made under different conditions at different times. Attempts to use photographic printing paper are of little use, because there are many rays that are visible and pass through glass which affect it as well as the ultra violet rays, and moreover the action is very rapid and prevents an accurate measurements. The most promising methods are those which depend on the liberation of a gas from a liquid contained in a quartz tube when exposed to the rays, but such methods have not yet been worked out for practical use.

STOCK AND PIECE DYEING

Naturally, when one sees so much of one color as we now do of olive drab there is also a tendency to reproduce it in all classes of goods. On one hand, there are the knitting yarns made from all grades of stock, from worsted down to the lowest grades of shoddy and noils, intended for ultimate use by the soldiers, and on the other hand the finer cloths for ladies' dress goods and various accessories brought into being by the military tendency of the fashions. A sharp distinction must be made between the shades that are the result of stock dyeing and mixing, and those which are yarn or piece dyed in solid shades. For stock dyeing we require fastness to scouring and often to fulling against white and fastness to light generally accompanies these qualities. For yarn and pieces the chief requirements are level dyeing, penetration, and, if possible, fastness to light. Fastness to light in easy leveling piece dyes is now out of the question with acid colors.

We can obtain Tartrazine and the American equivalent of Sorbine Red, but in place of the Alizarine Sapphirols we must use Acid Blacks or Indigotine. While Patent Blue and Fast Acid Violet 10B are now made, the supply and price puts them beyond the reach of this class of work. The dyebaths are worked with sulphuric acid and Glauber salt, the predominant color is the yellow, with a lesser quantity of red and only enough blue to darken the shade. It is not possible to give exact recipes at this time on account of the great variation in shade and strength of the dyes now being offered, but, with the experience acquired in the past few years, any dyer will be able to get the desired shade with the colors noted above. To get the necessary fastness to light is not possible with acid dyes, but we must use chrome colors.

The supply of chrome or mordant dyes is farly satisfactory. There are many made in this country and some imported from France, Switzerland and England. The true alizarines are rare and most of the dyes sold under that name are azo dyes. This is no detriment as many of the chrome colors are even superior to the true alizarines in some respects, especially in their dyeing qualities, such as leveling and penetration. Many are capable of being dyed in three ways, viz., chrome mordant, after-chromed and chromate or metachrome processes. After-chroming has never been as popular as the other processes because it is not so easy to match shades on account of the changes that take place after the chrome is applied. After-chrome colors are probably the best for yarns because the long boiling necessary to the other two methods is likely to cause felting and tangling.

The metachrome process, patented by the Berlin Aniline Works, and the chromate process, Cassella, add bichromates with the dye and by the gradual increase in temperature and addition of acid, either directly or by decomposition of ammonium salts, the wool becomes mordanted first and the dye then unites with it on the fiber. Only such dyes as will not precipitate in the cool bath will dye in this way. The processes were considered as great achievements and became very popular, but it is a well-known fact that over twenty years ago the essential features were to be found in a line of "one-dip alizarines" put out in paste form in Boston. The greatest drawback of one-bath chrome dyeings on pieces is that the free chromic acid is seldom reduced entirely or has exerted its full effect at the time the goods are removed from the bath, and when the piece is steamed, a further action takes place at the inside of the roll and a shading, or cloudy effects result.

The remedy is to finish with a little formic acid in the bath and insure the reduction of the chromic acid to a green chromium compound. If the dye will stand it a small quantity of sodium bisulphite would be more effective and much less expensive. Many of the one-bath chrome dyes as well as the after-chrome colors will leave silk effects white, and practically all will leave cotton and artificial silk unstained. Both classes of dyes should be tested out separately and their working qualities studied as some, particularly the blues of the Chromatrope series, may require a much larger amount of chrome than usual to develop the final shade, and if the color is not fully developed the fastness will suffer and further changes in shade may be expected during steaming or even during pressing by the tailor.

DYEINGS ON CHROME MORDANT

Dyeings on a chrome mordant need a few words of comment. If we are using a true alizarine in insoluble condition, or one made soluble by combination with bisulphites or other classes of dyes such as gallocyanine, which are often bisulphite compounds, we may only use a chrome mordant which has no oxidizing power. The non-oxidizing mordant is always greenish-blue in color and never has a trace of yellow. A yellowish chrome mordant contains some chromic acid and will cause a loss of coloring matter by oxidizing it in the bath. The precipitated color lake which is formed may remain in a fine colloidal condition and affix itself loosely to the fiber, giving later the appearance of a perfectly exhausted dyebath, but the goods will lose color in washing and generally crock.

One does not need to be so particular in using the ordinary dyes on a chrome mordant because most of them have the one-bath dyeing quality and will affix themselves to the wool rather than precipitate in the bath. To make the non-oxidizing mordant a strong reducing agent it is necessary to use with the bichromate. There is a scarcity of these at present and while formic, oxalic and tartaric acids could formerly be used, we can still obtain lactic acid. As a large amount must be used to obtain complete reduction in a reasonable length of time, the expense is likely to be too great. We can, however adapt the Amend process with a considerable saving in time and cost. The original process, patented over twenty years ago, worked the wool first in chromic acid (sold in crystal form), then in a cool bath of sodium bisulphite, which gave a complete reduction. We may charge the bath with 2 to 3 per cent of bichromate of soda and an equal amount of sulphuric acid, but as the acid causes the mordant to take on rapidly it is well to arrange to add the acid slowly after the wool is well wetted out.

Boiling causes a slight reduction at the expense of the wool itself but this also tends to cause a better penetration into the fiber substance. After twenty minutes or a half hour boiling the steam may be shut off and about 2 per cent of the commercial solution of sodium bisulphite slowly added so every part of the wool may be equally acted upon. The first change that takes place is the formation of chromium chromate, a yellowish brown color that compares with the reduction caused by tartar. Then in a quarter hour's time add slowly enough bisulphite to complete the reduction and give the desired greenish-blue color. The exact quantity cannot be calculated as it varies with conditions, but an excess does no harm and is removed in the rinsing that follows. Such a mordant is fast on the fiber and has no power to precipitate the color anywhere but on the wool. It is less costly than the regular methods and leaves the wool in softer condition. Another peculiarity that is remarkable is that cotton specks and threads also take on some of the mordant and some of the color during dyeing, and while never of a full shade do not show conspicuously.

A chrome mordant less reduced may also be made in this manner by the use of less bisulphite. As the stripping and fixing of colors on shoddy and rags is generally done by chrome and sulphuric acid, a final treatment with bisulphite will convert it into a satisfactory mordant for fast colors as well as for dyewood extracts.

There is a fairly large selection of dyes for the general work of dyeing yarns and pieces in solid shades, whatever process is used. The most adaptable yellow for all the chrome processes is generally sold as "alizarine yellow." This name covers a number of colors, none of which are either alizarine or anthracene derivatives, the majority being salicylic acid couplings with diazotized nitranilines or else pyrogallic acid condensation products. These yellows may be dyed in any of the three chrome processes and are remarkably fast to all influences. As with the acid dyeings the yellow element is the principal factor in the shade. A red is needed to prevent the blue or black from turning the shade to a green tone. The main consideration for the red used is that it shall dye evenly, and this seems to be the rarest quality of the available reds. Cloth red may only be used on a chrome mordant as the tendency to cloud the goods is very great, and on a chrome bottom the greatest care must be observed in regard to heating or the red will take on rapidly in spots. Omega Chrome Red and the Erio Chrome Reds are very satisfactory products and can be dyed by any of the three processes. Union Fast Claret is another excellent red of universal adaptability and remarkably fast, but we do not hear much of it at present. True Alizarine Red has again made its appearance, but it is not advisable to use the insoluble paste for shading, but the bisulphite compound, Alizarine Red S, would be quite suitable.

For the blue element there is a fairly large selection of blue-blacks and blues. The average chrome black of the Diamond or Palatine series, now on the market, while essentially after-chrome colors will dye on a chrome mordant and most of them will dye by the one-bath process. The dyeings are not as fast as when after-chromed, but are sufficient for goods that do not have to stand fulling. Blues of the Sulphon series are also available at present. They are difficult to dye level when used as acid colors, and after-chromed, but give less trouble in this respect when dyed on a chrome mordant or by the one bath process. Even the acid black, corresponding to Naphthol Blue-Black can be well utilized on mordant or after-chrome dyeings and the fastness to light will be sufficient for most purposes.

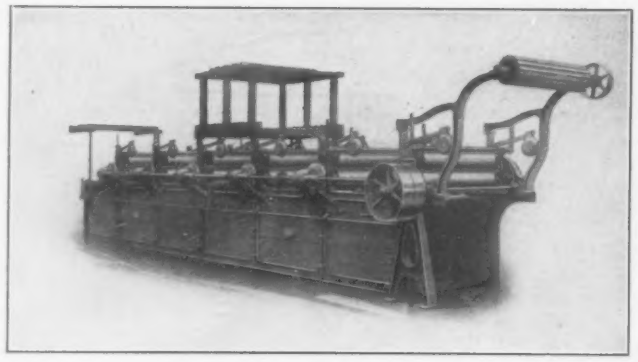
Much of the goods that are being dyed at present will be found to fall into one of the classes previously enumerated, but few of them are up to the strict requirements of the Government. At present there may be a tendency to be lenient and on account of the instant need for the goods to pass much which would otherwise be rejected. No one can tell when the specifications will be insisted upon more rigidly and it is well to consider how the color can be made to stand up to the most strict requirements.

Before the war the fastest standard for 16-ounce Melton, for instance, had been dyed with a combination of vat dyes, but as these are not now obtainable we will only consider the best means at our command at present.

PRACTICE IN BEST MILLS

The practice in the best mills, for meltons, flannels, tops for sweater, hosiery, glove and other yarns and for blanket wools was to chrome both before and after dyeing. A mordant of 2 per cent. of bichromate and 1½ per

Why Use Two Machines When One Will Do the Work?



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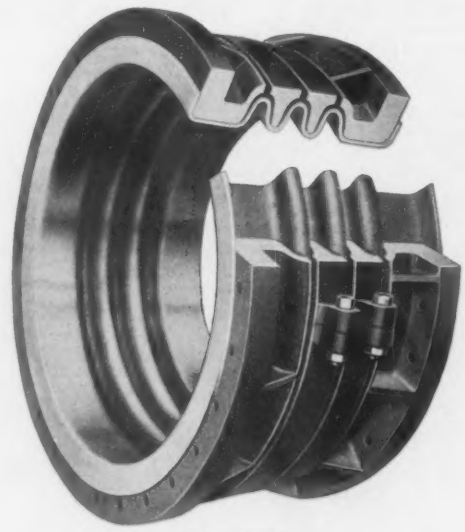

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cent. to 2 per cent of crude tartar, boiled for one hour, was the common practice. This was not a well reduced mordant and a certain amount of reduction of the chromic acid evidently took place during the dyeing process. While chrome assistants are scarce and high in price, the previous remarks regarding the use of sodium bisulphite might well be applied here. After the mordanting a rinsing followed and gave an opportunity for the wool to cool slightly and for the dyebath to be started cool in order to assist evenness and penetration.

The principal dye as before is Alizarine Yellow, the fastest color of the combination. The ideal blue or black is Alizarine Blue-Black, also known as Alizarine Black S (No. 423 in Green's translation of the Schultz and Julius tables). In the absence of this we may use a chrome black of the Diamond Black F type, but allowance must be made for a slight loss of color which occurs during the later processes.

There is not much choice of reds at present and red is the weakest point in the combination at all times. Before the war the old specifications, requiring a test with lactic and citric acids, might as well have been worded, "No red dyestuff can be used excepting Chrome Fast Red G or R," for all other red or reddish brown dyes failed to pass this test successfully. Even true alizarine reds were rapidly decolorized, although they were much faster to light and the washing tests.

One of the next best reds was Diamine Red F, which although a cotton color is also a remarkable chrome red. It dyes very fast shades by any of the three processes, using chrome on wool, and levels well. Omega Chrome Red and the Erio Chrome Reds, while not giving good results in the lactic and citric acid tests are satisfactory as regards the other tests. Alizarine Red S is a very practical red now that we do not need to consider these two tests. In the early days of the war when the dye shortage was most acute some good results were obtained by using Fast Red or Rocceline, which is not a chrome color at all, but seems to become fixed during the dyeing process. The proportioning of the various dyes used must be prefaced by a series of laboratory tests and dyeings of sample lots, because the lack of standards of dye strength would make any working formula useless unless the identical dyes were obtainable.

The dyer aims to get two shades, a full golden brown with a lively yellow overtone and an olive green with a yellow overtone. The shades must not be flat but will require at least 2 per cent of a strong Alizarine Yellow as a basis, with possibly ¼ per cent of red and ⅜ per cent. of black for the brown, while for the olive green the red is halved and the black doubled. The dyebath is started cool and the heat gradually increased while the wool is well worked and when the boiling point is reached the boiling continues for an hour. The bath has had no additions but the dyes, but some prefer to add 10 per cent of glauber salt, to favor evenness and penetration of the fiber. After an hour's boiling, 5 per cent of acetic acid is added and the boiling continued ½ hour longer, then a final chroming with 2 per cent of bichromate of soda follows in the same liquor. This develops the color to its full extent, but also strips the black and often produces a redder effect than was expected.

As some free chrome would be left on the stock, this is likely to turn green from its later reduction and so alter the shade it is usual to add a little formic acid to complete the reduction in the bath. It is likely that here also bisulphite of soda would be equally efficient. A thorough rinsing and drying follows. The whole process has consumed about 5 hours, counting time of loading the kettles.

The two shades are kept separate and are later mixed for spinning. A typical mixture consists of about 4 parts of brown, 3 parts of green, 2 parts of yellow and 1 part of white. A small sample mixing is made and carded, then a pad is scoured and rubbed by hand in soap until well felted, then rinsed and dried. The pad may be compared with the sample of cloth to be matched and any tests applied before going into the actual manufacture of a large lot. It is only by these precautions that success can be hoped for because one may have the proper dyes and process and yet find the sample pad to fail, and instances have been known of the regular work of the mill to suddenly show defects through a slight oversight in one of the earlier stages.

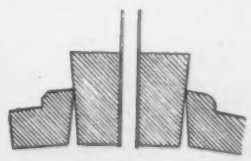
Cotton to be used in such fabrics as permit of the admixture of cotton must be dyed with sulphur colors. The variety of sulphur dyes now obtainable is not very great, but most of the shades used are only combinations of yellows, preferably of reddish shade, and black. The color inclines more toward the olive green but as long as the cotton is well covered almost any tone will answer and allowance can be made in the mixing. The sulphur dyebath is generally a standing kettle and for each lot dyed sodium sulphide and soda ash is added. After an hour's boiling it is best to throw the stock on a drain board and permit of an oxidation for an hour or two before rinsing. Rinse thoroughly several times as there is a danger of fires in the dryer if any sulphur compounds remain in the stock, particularly with low grades of cotton.

It is realized that our selection of available dyes is not what it should be, but we still have at our disposal enough of the necessary ones to furnish uniforms for the troops and there is no doubt that the variety will be increased rapidly as time goes on. Any difficulties that have been experienced in the past or present should impress the lawmakers of our nation with the importance of the industries which use, as well as those which make our dyestuffs, and give them the advantages accorded to other industries so that the future of American dyes and dyeing will be assured.

DEVICE FOR HASTENING FILTRATIONS

By R. R. Turner

Rapid filtration is largely dependent upon keeping the stem of the funnel filled with liquid; which in turn requires that the filter paper be so fit to the funnel as to minimize the formation of air channels. When the funnel-



stem does not fill spontaneously, as happens all to frequently, the column of liquid may often be given a start by directing a jet of water down the side of the funnel under the paper, or by exerting a slight momentary pressure with the palm of the hand over the funnel. The best way, however, to coax a reluctant liquid column is to use a combination of a No. 7 rubber stopper fitted with a short glass tube, with a Bailey crucible holder for Gooch crucibles. The latter article, also of rubber, is now found in most laboratories, or may be obtained at slight expense in the market. By holding this device firmly against the inside of the funnel above the filter, and blowing gently through the tube, a steady, regulated pressure may be applied, which will generally accomplish the result. The effect is the same as if gentle suction were used, without the considerable trouble of changing to a suction flask. The arrangement fits in an ordinary filter funnel without touching the filter, if the latter is not larger than the 11 cm. size. The slight concavity of the lower side serves not only to avoid contact with the liquid on the filter, but also to facilitate the making of a tight contact with the funnel walls.

This device has also been found useful occasionally in hastening the drainage of a filter, especially if some means is available for obtaining a current of air under slight pressure (e. g., compressed air supply, foot bellows, etc.)—(*The Chemist-Analyst.*)

Waterproofing Processes for Textile Fabrics*

War Demands for Covering Decks, Trucks and Stores at Supply Stations and Bases

By *William H. Adams*

THE great growth of waterproofing processes began in 1877 and nearly every method now in use was patented between 1877 and 1888. Later patents are largely modifications of these original processes.

The principal processes in successful use today may be divided into five classes:

First: The direct application of tars, bitumens, oils or waxes, with or without the aid of heat.

Second: The treatment of fabrics with waterproof materials dissolved in volatile solvents.

Third: The chemical production in the fabrics of water-repelling metallic oxides or salts, or of metallic soaps, or the use of hot watery emulsions of easily melted waterproof materials to saturate fabrics which retain the waterproofing after the water in the emulsion is dried out.

Fourth: The use of various natural rubbers, gums and oils vulcanized by sulphur compounds.

Fifth: Waterproofing fabrics by partially dissolving the material of the cloth itself in chemicals which leave the partially dissolved materials in the form of a glaze or coating on and in the unchanged material of the fabric.

PROCESSES SOMETIMES COMBINED

Several processes are sometimes used in succession or combination. Each of these processes has its own field and its own merits. On the whole the most completely waterproof is the vulcanized rubber process, which leaves an impervious and continuous elastic coating attached to the surface of the fabric; but its high cost leaves a large field for less complete but still efficient processes.

Oxidized drying oils produce the well known oil ducks, enamel ducks, carriage cloths and oil clothing. The process sometimes known as oxide treatment or "cravennetting," is very largely used for rainproofing clothing, light tents, and light fabrics generally. Plain or dyed paraffine goods, usually closely woven drills or ducks, are probably of greater interest, however, owing to their relatively low cost and wide application for horse covers, wagon covers, waterproof clothing and many general uses. Of late new waterproofings made with volatile solutions applied to specially prepared fabrics have gained great favor because of their softness, flexibility and leathery feel, and greater permanence than paraffine.

These newer finishes have found application in the form of decking for vessels, hatch, barge, sail, horse and truck covers, stable tents, ground cloths, roofings, tentage, etc., often along lines where paraffine duck had not been entirely satisfactory. These waterproof fabrics have opened up new fields without at all diminishing the use of paraffine ducks; indeed they have had a considerable influence in increasing the popularity of waterproofing generally. Of late, also, the use of oxide and mineral soap treatments for rainproofing drab-dyed sheetings or jeans has greatly increased and the fabrics are very satisfactory for light tents for auto tourists, prospectors, canoeists, rangers, etc.

LARGE QUANTITIES FOR WAR

The European war has called for large quantities of neutral colored heavy waterproof goods for covers for the motor trucks which have played so important a part in the war, and for covering piles of shells and stores at field supply stations and bases. The use of tents, so important in previous wars, has been unexpectedly small in the present great struggle on account of the trench warfare and the thickly set villages and hamlets available for quartering the troops.

The war is more directly felt in the scarcity and high prices of many imported materials needed to dye and waterproof fabrics. In one way this has been of great benefit in bringing again into use the old-fashioned but fast and valuable cutch dyeings which are much more resistant to mildew than are aniline colors. The changed conditions due to the war have also stimulated the production here of fabrics in green and brown finishes formerly only imported, but now made here, and possessing many unique and valuable qualities.

One class of fabrics previously imported only, and not made or largely used in this country, is complicated and occasionally dangerous to manufacture. This is the so-called "Willesden" goods, prepared by solutions of copper in strong ammonia, which superficially dissolve and gelatinize the fabric. They are exceedingly beautiful green fabrics with a marked silky sheen and considerable waterproof qualities and are by far the most mildew proof of any fabrics made.

These fabrics are now being made in the United States and will find uses in many fields. The somewhat similar "viscose" process, which uses strong caustic soda and busulphide of carbon as its dissolving and gelatinizing solutions is also being exploited. The gelatinized fabrics are so different from other waterproof goods that it seems probable that they will find entirely new fields of usefulness without displacing present processes.

SUITABLE FABRIC REQUIRED

The selection of the fabrics which are to be waterproofed is almost as im-

* From paper presented at Convention of National Tent and Awning Makers' Association.

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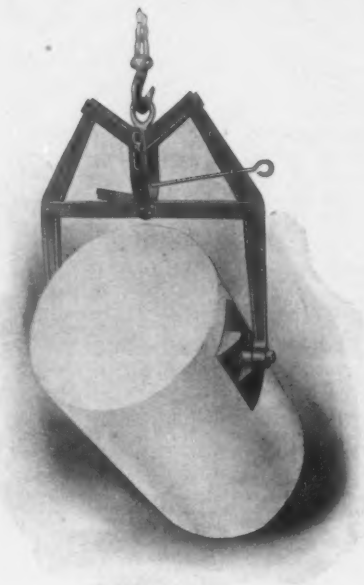
CAUSTIC SODA



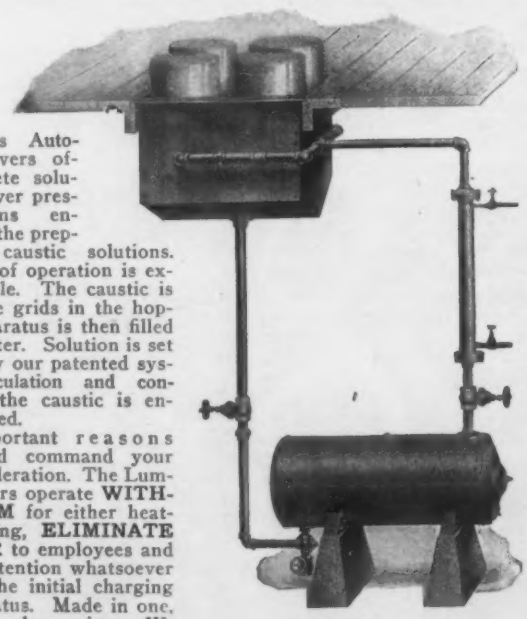
Lummus Lifting Tongs

have successfully abolished one of the most serious features connected with the handling of LUMP CAUSTIC SODA, namely, the danger of severe burns to employees. The trip latch allows of easy removal and accurate centering of the jaws upon the cake without the necessity of workmen touching caustic in any way.

Swivel jaws permit of placing the cakes of caustic either in a vertical or horizontal position. The Lummus Lifting Tongs built to withstand hard usage are made of cast steel, jaws of Black Diamond tool steel, and will not break.

Bulletin 583 describes them in full.

Caustic Soda Dissolver



The Lummus Automatic Dissolvers offer a complete solution of the ever present problems encountered in the preparation of caustic solutions. The method of operation is extremely simple. The caustic is placed on the grids in the hopper; the apparatus is then filled with cold water. Solution is set up at once by our patented system of circulation and continues until the caustic is entirely dissolved.

Three important reasons which should command your serious consideration. The Lummus Dissolvers operate **WITHOUT STEAM** for either heating or stirring, **ELIMINATE** all **DANGER** to employees and require no attention whatsoever other than the initial charging of the apparatus. Made in one, four and ten drum sizes. We are in position to make prompt deliveries.

Bulletin No. 517 describes them in detail.

THE WALTER E. LUMMUS COMPANY

173 Milk Street, Boston, Mass.

portant as the method of waterproofing, although this is often lost sight of or not fully appreciated by the customer. Waterproofers are asked and expected to treat fabrics running all the way from fly screening and horse netting to the heaviest ducks woven, but their chief troubles come from customers who expect to start with 4 oz., 5 oz., or 6 oz. single filling duck, and obtain permanently waterproof results. They fail, for the simple reason that a fabric lacking sufficient substance and closeness of weave to stand handling and pulling without opening up will not furnish a suitable foundation for waterproofing.

Owing to their weaker construction, single filling ducks are least suitable for waterproofing. Anything lighter than 8 oz. is hardly worth treating and is always much inferior to good double filling or army duck. Except for tent purposes it is unwise to waterproof goods under 8 oz. for any use involving rough handling.

The most satisfactory results come from using 10 ounce and 12 ounce army ducks, or No. 12, No. 10 and No. 8 ducks, as these are sufficiently heavy for all usual purposes except heavy cover and tarpaulin work, which calls for No. 4, No. 5, or No. 6. In a similar way lighter fabrics should be of close and fine weaves, a good jean or close woven sheeting giving satisfactory results for light tentage, while osnaburgs, tickings or similar heavy fabrics of more open weave are not satisfactory. Waterproofers cannot miraculously cure defective construction or fill holes in fabrics, although they are far too often asked and expected to do so.

USES OF DIFFERENT FINISHES

A somewhat extensive observation of the field shows that the heavy and dark tarpaulin finishes are naturally restricted to large barge, boat and hatch covers and heavy truck covers calling for the maximum of strength, endurance and waterproof qualities as given by the bitumen or new soft waterproof process. Paraffine ducks are quite unsuitable for this work, on account of their stiffness in cold weather, and their tendency to develop leaks in hot weather. The lighter weight covers used on trucks and wagons by contractors or for military stores, etc., are also best made from genuine tarpaulin or soft waterproof fabrics, although a certain amount of paraffine duck is used for this purpose in warmer climates. Horse covers furnish a large field for waterproof duck, and opinion is divided between paraffine duck and soft waterproofing for this purpose, largely along lines of climate. The lighter oxide or emulsion proofing is restricted chiefly to light tentage, a field which it disputes with soft waterproofing, but with which paraffine does not seriously compete; for waterproof clothing, robes, hats, etc.

The green copper waterproofs have wide application for fly nettings, horse nets, tobacco cloths, light tentage and fabrics to successfully withstand the extreme tropical humidity and mildew producing conditions. A point not always understood is that paraffine in itself offers little resistance to mildew unless the fabric itself is previously treated for preservation.

THOROUGH KNOWLEDGE REQUIRED

From time to time there appear in various publications, ranging from the Sunday supplements of daily papers to trade and alleged technical magazines, directions for waterproofing duck and similar fabrics while you wait and at infinitesimal costs. The receipts are much of a pattern, and are usually based on liberal treatment of hot soapsuds or alum, sugar of lead, with or without the addition of various fancy ingredients, according to the imagination of the contributor. One or two of these receipts have evidently been clipped and reprinted for years, and in some cases have caused a credulous reader to start a waterproofing business on no firmer foundation than these quite misleading articles.

It is true that some of these treatments thoroughly and painstakingly carried out by expert manipulators on fabrics of high grade, and almost waterproof before treatment, will give fairly satisfactory results; but no casually and superficially applied treatment of this sort can thoroughly penetrate and proof clear to the heart of the closely twisted threads of which a duck is composed, nor are they satisfactory in treating the lighter and more open fabrics.

The apparently low cost of these treatments and of hand-applied treatments generally is misleading, because it ignores all items of expense except the actual materials employed, no allowance being made for labor, overhead or fixed charges, which should be taken into account, no matter what the nature of the process. Moreover, such hand treatments are always uneven and usually defective in unsuspected spots, while in appearance the results are best described by the word "messy." Nevertheless the proper hand application of scientifically prepared and well tried out waterproofing liquid preparation offers great facilities for odd job and local construction and repair work and goes hand in hand with the use of the machine treated goods.

The large operators have come to the conclusion based upon experience that the uniform appearance, freedom from defect and moderate actual costs of machine treated goods outweigh the supposed economy, more imaginary than real, of the various hand applied processes, and it seems to be nearly a rule that the firms whose business in waterproof goods and products made from them is satisfactorily increasing, almost without exception are having their goods machine treated. Moreover, the waterproofers who specialize on such work have facilities for storage, for examination and for proper handling of fabrics in the best possible manner, as well as wide experience, the benefit of which they offer to their patrons and which many times prevent loss and disappointment through the treatment of improper or defective goods. The usual result of the amateur or garden variety of waterproofing treatment is to thoroughly disgust all concerned with waterproof fabrics, while on the contrary the use of well waterproofed machine finishes give general satisfaction and results in the continually increasing use of such fabrics.

Bleaching Mixed Hosiery

A form of hosiery which is at present very much in demand is constructed with mercerized cotton forming the top, and artificial silk and China silk forming the combination. The bleaching of this class of fabric requires a special process, carefully conducted. At the outset the goods should be boiled off in the way adopted for all-silk goods. They should be immersed in a solution of soap containing about 10 per cent good quality soap, and boiled for two to three hours, or until the silk portion of the material becomes clear of all foreign matter. In some instances it may be an advantage to strip the silk before the boiling-off operation. In the latter circumstances the work may be started by heating for about one hour the mixed material in a liquor containing one pound of soap to each gallon of water. The proportion of water usually required is one gallon to each pound of material. Afterwards, squeeze and rinse. A second liquor of the same volume is prepared with soap (¼ lb.), and soda crystals (2 ozs.), in which the material is further treated and then rinsed well in clean water. This preparation forms a suitable ground for the operation of bleaching. For a mixed fabric of the sort under consideration the best bleaching agent is a peroxide.

A suitable bleaching liquor may be prepared by adding to water (600 gallons, the reasonable volume for 100 lbs. of material), 24 lbs. of sulphuric acid, stirring very well, and then adding slowly 16 lbs. of dry sodium peroxide. The acidity of the resulting liquor is next neutralized by the addition of the required amount of a solution of silicate of soda. The goods which have been boiled off, are immersed in this liquor and gently moved about for half an hour, during which period the temperature is raised to 160 degrees F., and further gentle manipulation continued while 200 degrees F. is reached. The operation is prolonged until the desired degree of whiteness has been attained. The goods are finally washed well and finished according to the particular requirements of the case.

These are the essential features of the process for the bleaching of fabrics composed of a mixture of mercerized cotton, artificial silk, and natural silk. Obviously the details of the procedure may require some modification according to the percentage amount of mercerized cotton present in the composite fabric. In the absence of the dictates of experience in this matter, it is advisable to determine the modification needed by trials on a small scale.—*The Textile Mercury.*

Water-Resisting Process on Military Cloths

Will Conserve Wool and Increase Efficiency—Confused with Waterproofing Tests

By *Herbert P. Pearson and Fred Sundermann, Jr.**

MISCONCEPTION regarding the term waterproofing and the waterproofing industry is responsible for two unfortunate facts. The United States soldier is clothed in materials which absorbs water nearly as easily as the paper you blot your signature with, and the textile industry in general is ignoring the resistance to such absorption as an important factor in the conservation of wool.

The reason for this condition of affairs is that the minds of nearly all army officials and of some textile experts are clouded with the idea that to make a fabric water-resistant is to waterproof it, and that to waterproof it is to close up its pores and change its appearance and other properties.

They are right about the effects of waterproofing because, as the dictionary tells us, a waterproofed fabric is one that is impervious to water and you can't make a textile fabric impervious without closing up the holes that are in it; that is to say the spaces between the fibers. Even the company we have the honor to represent has not as yet succeeded in making a hole impervious to water.

WHERE MISTAKE IS MADE

Where the responsible parties go wrong—and it sometimes takes thirty minutes' personal lecturing to make them see that they may be wrong—is in assuming that a fabric cannot be benefited in the direction of waterproofing without being waterproofed. We propose to demonstrate how without change of appearance or filling up of pores, the woolen fabrics used in army uniforms and overcoats are being successfully processed to make them much less absorbent, much quicker to dry when wetted, and possess much better wearing quality, by the simple means of treating the fabric in order to lower the surface tension of the fibers as compared with that of water. To these processes we are attaching the name "water-resisting" and to the fabrics processed the term "water-resistant" to distinguish them from waterproofing processes and impervious fabrics.

Right here it would be well to state that many wearers of raincoats made of fabrics, the pores of which are not closed, are deceived by the terms "showerproof" and "rainproof," under which they are sold. A shower is rain anyway and rain is water, which, if pressed hard enough into the fabric by the weight of the raindrops accompanied by the driving of the wind, will go through any porous fabric if the pressure is great enough, however efficient the water-resisting process.

Even a raincoat made of rubberized fabric is apt to let water through under the higher pressures induced by extreme weather, if the rubberizing does not completely close the pores or if the seams are not heavily enough cemented. What then, may be asked, is the good of a water-proofing process of a fabric if it is not impervious under all conditions

QUALITIES OF PROCESS

We reply that without altering the appearance or adaptability of most textile fabrics we can impregnate the fibers with substances which make them quite difficult to wet and when wet, dry out very quickly owing to the lack of thorough wetting through of the fibers under ordinary adverse weather conditions. This resistance to wetting is not all the effect that can be produced by this means, for with a fabric of suitable character a considerable resistance to the penetration of water can be procured.

If the fabric is of the right kind and the water-resistance effectual, a garment may be made of it which will keep out rain to a very considerable degree. If the water-resistant fabric is of open weave, the pressure of a raindrop may cause it to go right through, but the fabric itself will not become wet either immediately or readily. To wet the fabric the tiny pores of the fibers themselves have to be penetrated, and this requires greater force than the mere pressure of ordinary raindrops. Open-weave fabrics of this sort can be produced which can only be thoroughly wet by applying repeated blows to water laid on the surface of the fabric, or by dabbing repeatedly with a wet object.

TESTS BY GOVERNMENT

We know by the experience of many not strictly comparative wearing tests that this resistance to wetting increases the life of the fabric considerably and we are at present conducting a series of wearing tests to demonstrate this beyond doubt and to arrive with some degree of accuracy at the extent of the increased wearing quality.

* General Manager and Works Manager, respectively, of Cravenette Co., U. S. A. Paper presented before American Chemical Society.

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We have a number of woolen suits, some untreated and others made water-resistant, undergoing a comparative test in ordinary wear and the Quartermaster's office of the War Department has given instructions for a comparative test of wool uniforms and overcoats. This latter is to be done by clothing a platoon of men with water-resisting coats and uniforms and another with garments made of the same cloth untreated.

Apart from our experiences of a number of years, the theory of the lengthened life of the treated fabric is that the wool fiber on becoming wet changed its curl and on drying again resumed, to a great extent, its former state. This causes a movement in the fabric and a loosening of the yarns which tends to weaken their resistance to friction, for it is common knowledge that a tightly twisted yarn wears better than one of looser character.

RESULTS OF PREVIOUS TESTS

We have made numerous tests of the reduction in the absorption power of wool and cotton by exposing samples to a shower with a thirty-foot drop, hanging to drain and observing the increased weight and then the rate of drying. The following figures give some of the results obtained on wool fabrics. The drying referred to consisted of hanging for one hour in a warm room.

A heavy mackinaw cloth, untreated, under a very heavy test absorbed 141 per cent water against 25 per cent and after drying contained 101 per cent against 9 per cent treated.

A heavy army overcoating under a light test absorbed 38 per cent of water against 15 per cent treated, and after drying contained 12 per cent against 3 per cent treated.

A thick grey all-wool flannel under a heavy test absorbed 140 per cent against 60 per cent treated, and after drying contained 104 per cent against 32 per cent treated.

We estimate from these observations that a soldier caught in a winter downpour of rain is soon carrying about with him in his overcoat no less than 7 pounds of water, whereas if the fabric is made water-resistant the most he is likely to carry is 3-pounds and it is obvious that this saving of weight means a great deal when on the march.

PROCESS NOT EXPENSIVE

The processes through which fabrics are put to make them water-resistant are not expensive. They add less than 1 per cent to the cost of a garment and even if they only increase the life of the garment 10 per cent there is a very obvious saving.

The object of the water-resister as distinguished from the waterproofer is to impregnate the fabric and the fiber of the fabric with a water-resisting substance, taking care that the substance has as high a melting point as possible in order to avoid the shifting of the protecting body under the influences of the sun. It is also necessary, and quite an expert task, to eliminate from the fabric beforehand any substance which might mix with the water-resisting agent and thus raise its surface tension.

CONTRIBUTES TO HEALTH

In a conversation recently the point was brought out that if all the American army uniforms had been made water-resistent, many a case of pneumonia among the soldiers might have been avoided. While this may be somewhat exaggerated, it is nevertheless certain that to make it much less easy for a uniform to get wet and much easier for it to dry when wet, is to contribute to the health and efficiency of the soldier.

We submit, therefore, that it is in the interest both of military economy and efficiency and of the conservation of wool, for every yard of wool fabric made up into every kind of garment during the war to be subjected to a thorough and expert water-resisting process, and we shall be grateful for any assistance which will enable us to secure action in this direction from the responsible authorities. Finally we may say that our company is willing to co-operate with the Government in every possible way with this end in view.

Wool Dyeing for Woven Fabrics

Reminiscences by an Old Superintendent—Raw Stock and Piece Dyeing—Scouring

OTHER conditions being equal, it is reasonable to expect that colors dyed on raw stock will be more substantial than colors dyed on woven fabrics. Sometimes the texture of cloth is so much broken up and felted or the yarn is so hard twisted that the dye cannot penetrate it clear through and the center is left undyed, or slightly stained. Nevertheless, piece dyeing is almost invariably done in the case of solid colors or shades for the reason that it allows the cloth to be finished in a cleaner condition, as the innumerable particles of matter, always sticking or flying around, are either avoided to a great extent or covered up in the dyeing.

The result of manufacturing cloth from solid black wool is well known to those in the mill who are concerned. They would probably testify that after being fulled and dried it is hard to distinguish such a cloth from a dark oxford grey. Yet such was the method used in the woolen trade before the introduction of piece dyeing machines, which are a comparatively late development, and pertain more particularly to worsted goods than those of wool. Dyeing in a woolen mill at the present time is largely confined to the raw stock, either in the wool itself or in shoddy and cotton, which may be used in a blended combination of the raw material, or to produce separate yarns, which can be arranged together in an order to form a pattern.

ADVANCE IN DYEING

Dyers in earlier times were practically untrained in any school of chemistry, and somewhat like contemporary medical men, as once related in a lecture by an eminent member of that profession, they knew the remedies for certain troubles but were ignorant as to the reasons for their efficacy. Old-time dyers almost entirely depended upon crude knowledge, confirmed by what they had experienced in their own practice. Such, of course, is the most expensive kind of teaching, as in many cases much waste of time and material is made before the proper road to follow is discovered.

In the days when woolen cloth dyed indigo blue was about as common as worsted serge is now, the blue vat was a cause of anxious care to the dyer who had charge of it, as its workings were often a mystery to the most skillful men, and consultations were frequent in regard to it when a crisis was expected. There were no textile schools at that period and the young dyer was gravely handicapped in his search for knowledge, as dry salters who sold the dyestuffs knew very little about their application, and as there was no published information concerning them, the only source of enlightenment was from the older men of more experience.

Great advancement has been made in respect to conditions in dyeing and the status of dyers. The old style of dyehouses in which the escaping steam often obscured the proceedings have given way largely to the new idea of cleanliness, good light and good ventilation. Also the class of dyers who could be seen in workman's garb and wooden clogs busily at work stuffing dye kettles, has disappeared and the succeeding class, through being possessed of greater chemical knowledge, have generally managed to raise the level of their rank. In many places the former title of dyer has been changed to chemist, and the same is considered to belong to a profession instead of a trade.

SCOURING THE WOOL

The first duty of a dyer is to see that the wool is clean enough to properly take on the coloring matter, and unless it is bought in that condition, scouring is essential for befitting results. The object of scouring is to clean off the external dirty and greasy matter, and to do this thoroughly without injuring the vital properties is the problem to be solved. To have this done consistently, the work must be supervised by one conversant with the nature of alkalies, so that they may be applied in suitable strength, because if too weak, the action will not be effective, and if too strong the wool will probably be depreciated in more respects than one, as appearance, strength, and feel are all liable to be affected.

Seeing that the dyer has to subsequently handle the stock and be responsible for its efficient state, it is only reasonable that it be treated according to his dictates. The old method of scouring, now obsolete in up-to-date mills, was by the soaking and stirring tubs, then the material passed to the rinse box and squeezing rollers. This principle is retained in the modern scouring machine, which not only turns out the wool in a cleaner condition, but also performs the work more expeditiously and more economically.

Coarse wools are usually easier to clean than fine ones, because they are more open and have less capacity to hold superfluous matter. Old wools are also more easily cleaned than new, for the reason that they sweat freely when stored in comfortably warm places. It is, therefore, expedient that the scourer should feel his way when doing the work, and if in doubt act on the sparing side until reassured as to the requirements.

The scouring liquor must not be too hot, as under such terms felting is very liable to take place, which is a particularly undesirable result. When the material to be scoured is extra dirty it is best to have a preliminary soaking tub or tank, within easy reach of the other attached to the machine.

RELATING TO MORDANTS

Mordanting before dyeing is the predominating practice in woolen mills with which the writer is familiar. The mordant on the wool is like unto the primary coat upon the wooden wall, which reinforces and adds to the bloom of paint subsequently applied, thus the color lake on the former is similarly fortified against the ravages of wear. A high authority avers that as a class mordant dyestuffs are the fastest colors known, and their fastness to light, washing, soaping, alkalies, acids, perspiration, and in fact nearly all of the color destroying agencies, have given them an unquestioned standing and have led many armies, navies and railroad companies to adopt them for the coloring of the uniforms.

The chromium mordants are most commonly used in woolen mills on account of their convenient applicability. The wool is put into the preparing kettle and boiled from 1 to 1½ hours according to the quality of stock, in a bath containing from 2 to 4 per cent. of bichromate and 2 to 3 per cent. of lactic acid. In the boiling there is a gradual disunion of the mordants and slow deposition of their properties upon the wool. It is best not to dry the mordanted material before being dyed.

PROCESS OF DYEING

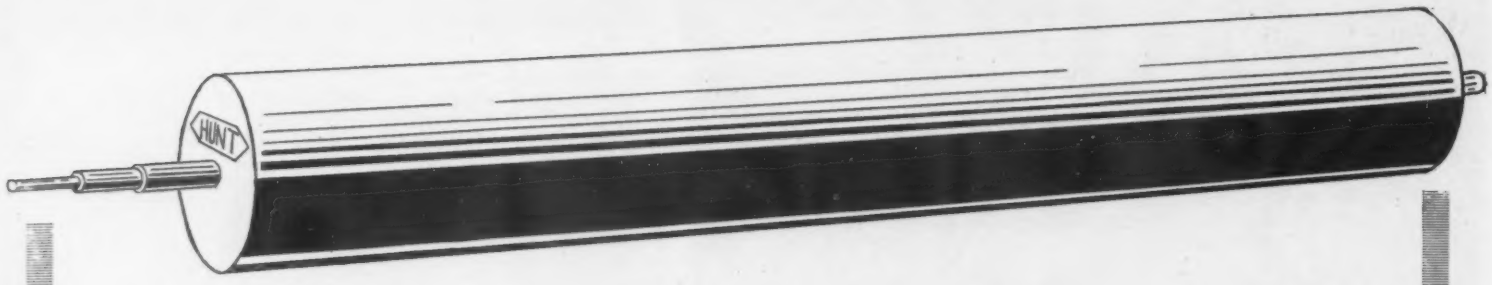
There is probably as much stock dyed black in the average woolen or worsted mill, as there is of any other shade, and also more black dyestuff used than there is of all the others combined. There are reputable dyers who maintain that through the agency of lactic acid, a better black can be dyed with logwood than with alizarine. And of course what refers to logwood black in such respect also applies to logwood blue. It was the common practice some 30 years ago to import logwood chips, and extract their essence by boiling them in bags suspended on a pole stretched across the dyeing kettle. Such a method was effective enough, but it was slow and expensive, as it requires just about as much time and steam to do the extracting as to do the dyeing.

Recipes for dyeing must be considered as conditional rather than positive, because there is no general standard depth of shade and different concerns may require such in distinct casts. In regard to black, some prefer to have it of a blue tint, others of a jet, therefore, if a mordant color, it may be expedient to vary the principal to suit the case. With a straight chromium mordant, blue shades are produced, but by using copper sulphate in the mordanting bath, a dead black is obtained. The same result can be accomplished with the chromium mordant by adding a small amount of yellow dyestuff and a sprinkling of a dullish red, to the dye bath along with the logwood. The recipe here given, to be dyed according to the method of mordanting stated in the foregoing, is recommended by a competent authority.

For 100 lbs. of wool, 46 lbs. logwood chips, or equivalent in extract, 4 lbs. fustic, enter at 100 deg. F., bring slowly to a boil, and keep boiling from 1¼ to 1½ hours. It is very important to have the black dyed consistently the same shade and a good sized standard sample should be kept by the dyer for reference purposes.

In this connection the writer had once an experience in a fancy woolen mill which caused a serious loss to the company. The orders received were taken from samples in which the black contained was dyed with logwood, but before a start was made to produce goods, a change of dyers took place, and on the recommendation of the new man alizarine black was substituted for the other. This was considered to be an improvement until the pieces came to the examining perch, and then it was found that the colorings, mostly composed of black and grays, did not at all match the shade of selling samples, these being of a bluish cast, and the pieces a dead black. The sample pieces submitted were rejected in many cases and they could not be remade in time to suit the customers.

The methods that are effectual in the shortest boiling time are the best, as then there is the least danger of the stock being felted or otherwise injured.



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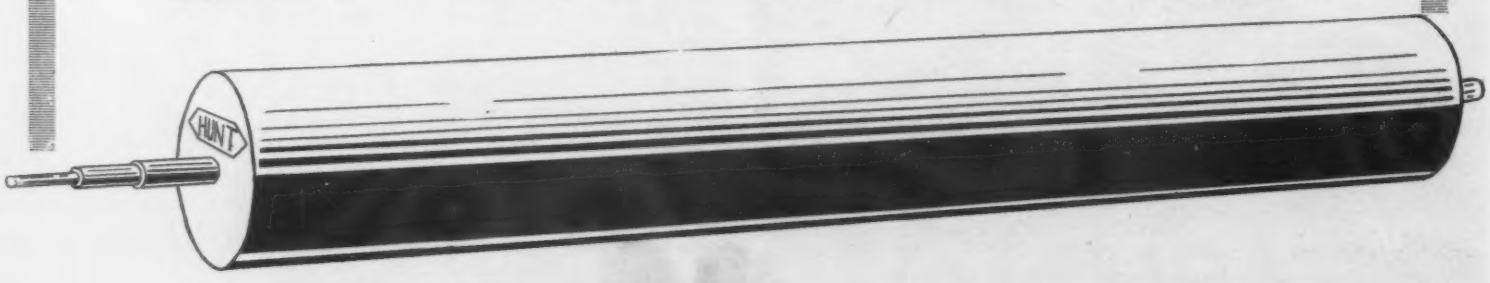

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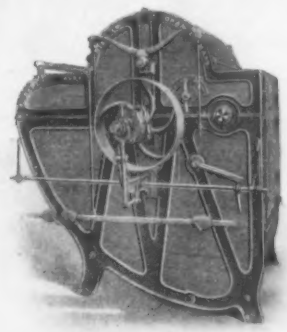

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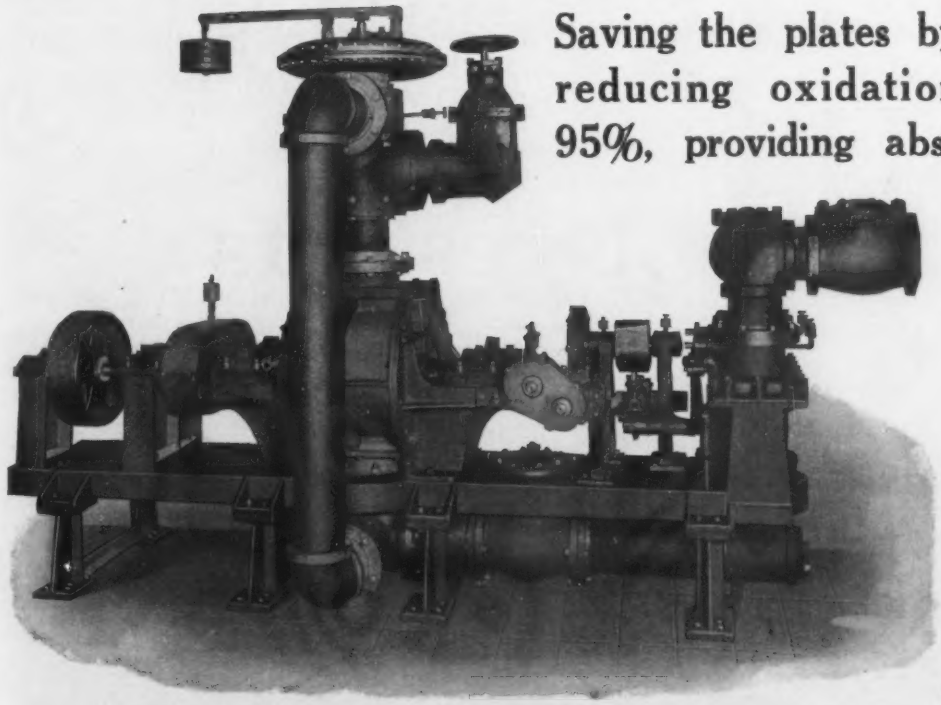

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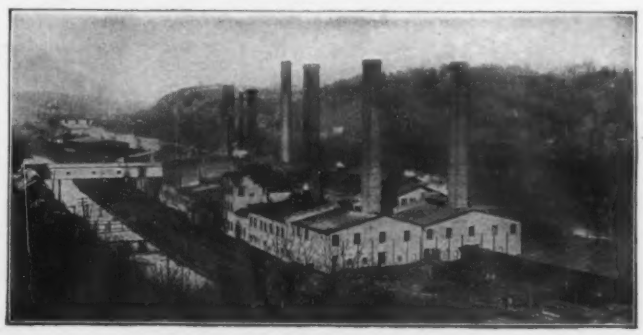

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For the God of Battles cometh
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He is come to break War's tyrant;
He is come to set us free;
He is come to rear a kingdom
On the Brotherhood to be.

He has stirred the souls of millions
To withstand the great attack;
He has led them through Hell's fury
As they beat the Dragon back.

He is calling every freeman
To prepare to do his best
To uphold his noble birthright
In this last and greatest test.

Let us heed the splendid summons;
Let us join the common cause;
Let us climb the heights of manhood;
Let none falter; let none pause;

Till the Hosts of Death are vanquished;
Till the Autocrat is slain;
Till the God of Battles triumphs
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THE CLEVELAND WORSTED MILLS CO
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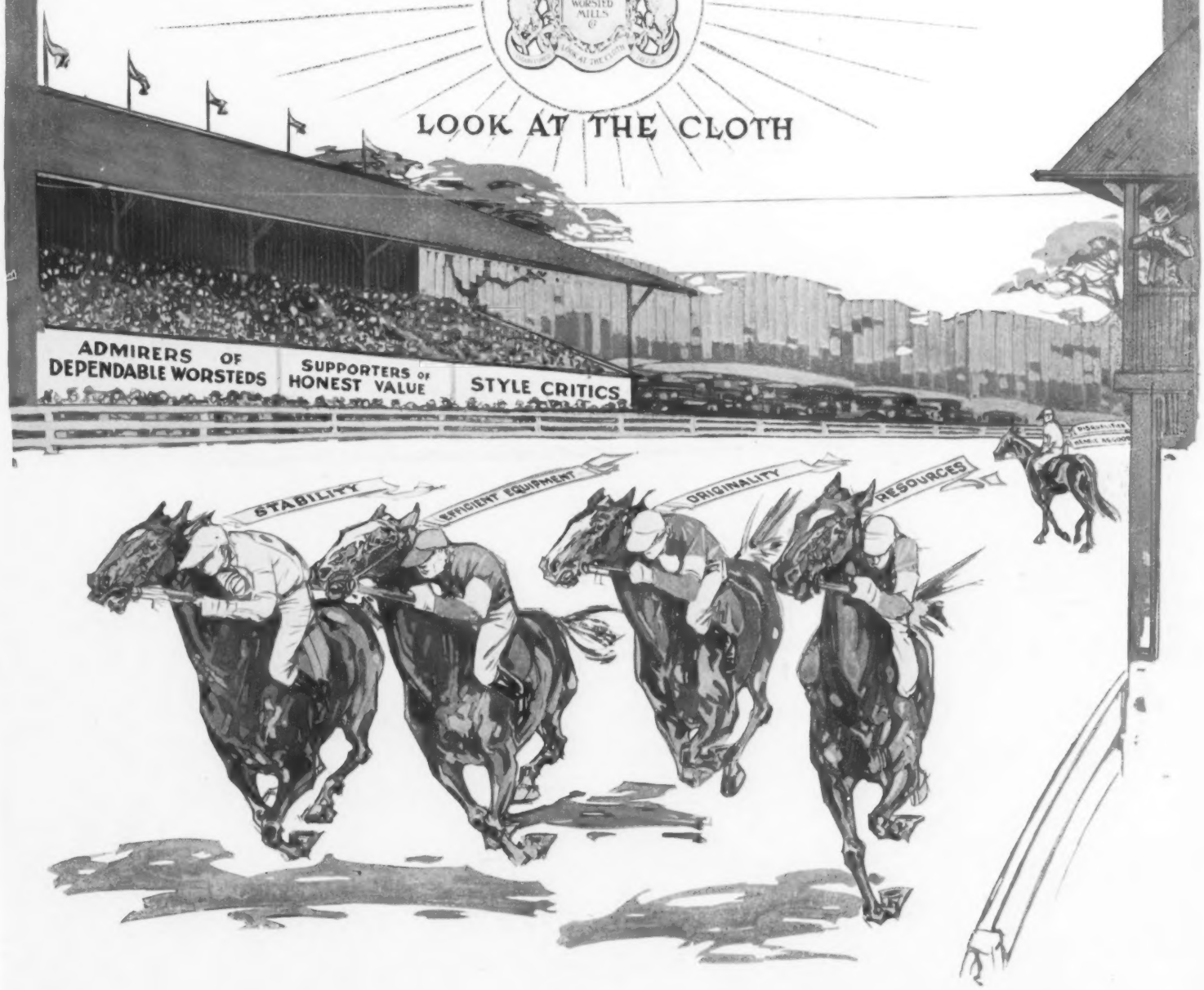
LOOK AT THE CLOTH



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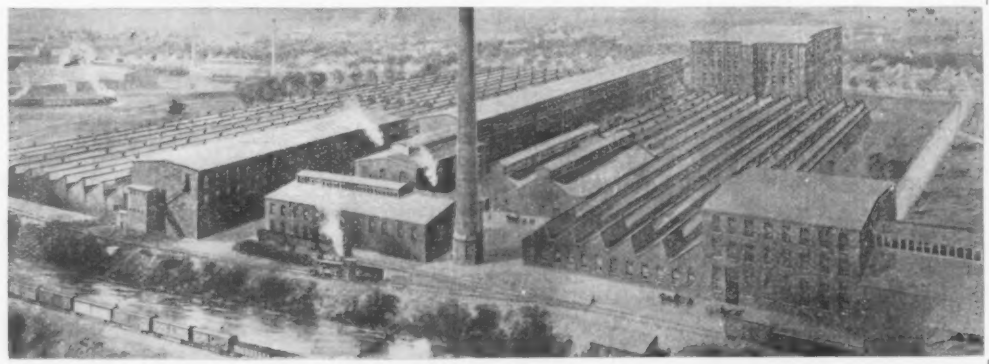

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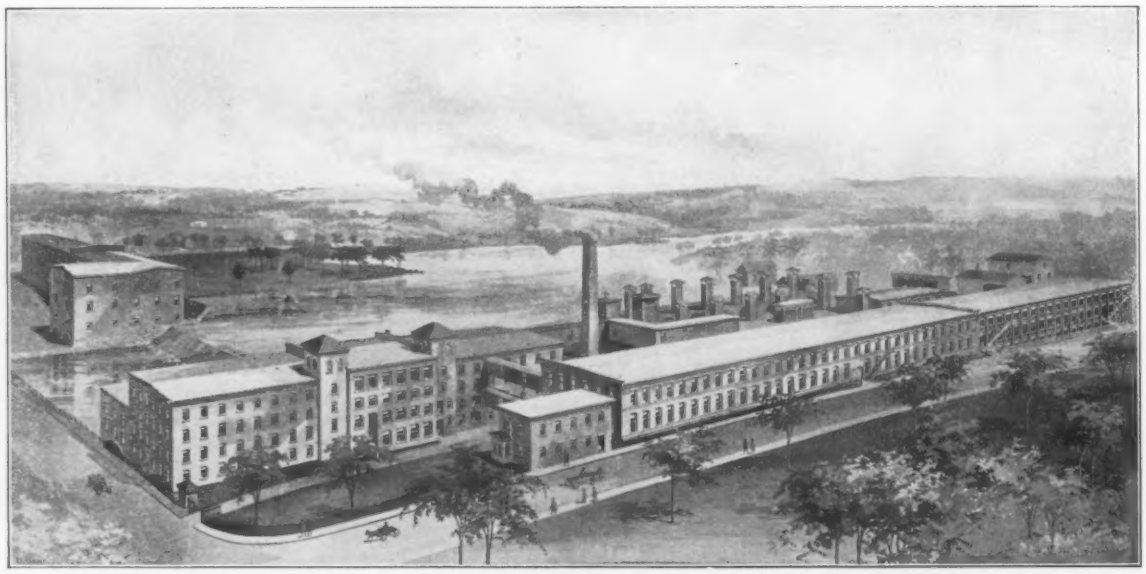

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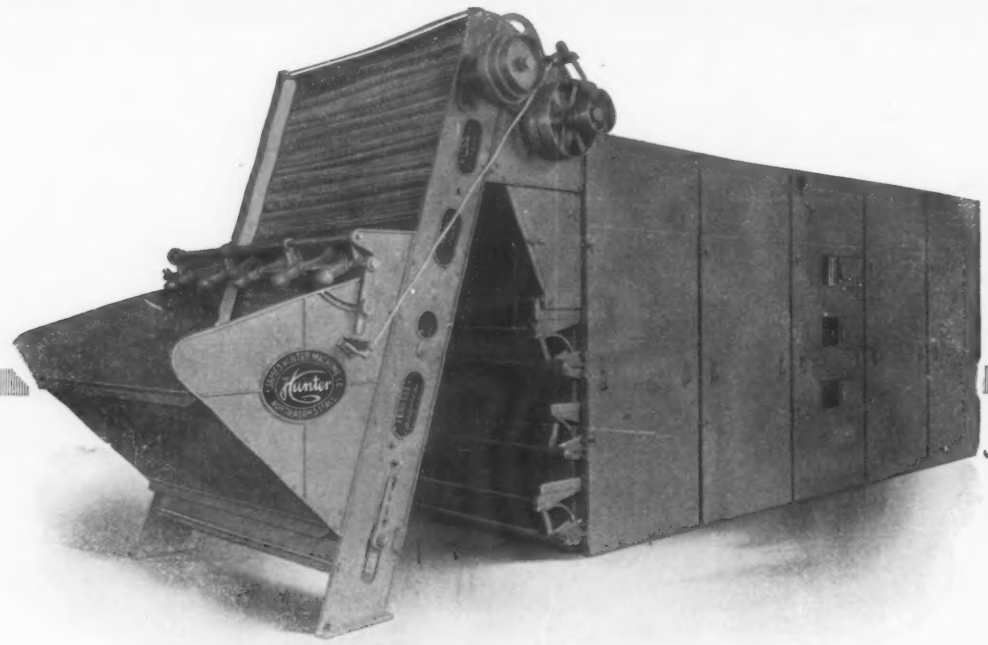

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JAMES HUNTER MACHINE CO.

NORTH ADAMS, MASS.

Woolens Controlled by Government Purchases

Civilian Business Relegated to the Background Very Generally

WAR'S dominance in all the relations between men's wear manufacturers and their customers has been an outstanding feature throughout the year. Civilian business has had to take a subordinate position and although buying has been during certain parts of the year of normal size and of satisfactory proportions, yet the lessened request for merchandise, brought about in connection with the wave of economy and with the various methods of conservation that have been urged and practised, has not caused any particular hardship to the buyer, though what it may do for the coming heavy-weight season is a matter concerning which there is more or less speculation. It has been a matter for general comment that notwithstanding prices that formerly were considered absolutely out of the question and which were prophesied as likely to bring about stagnation in trade buyers have followed the market up and seemingly are just as willing to provide for their requirements to-day at the highest levels that have obtained in a generation as when prices were on a pre-war basis.

CLOTHIERS' FORECASTS INCORRECT

Not only was the first hand seller mistaken in his idea that the clothier would not buy as prices advanced radically, but the clothier himself had a wrong conception of the possibilities of the absorbing demand of the country. The latter felt it was wise policy to proceed slowly for fear that it would be impossible to market his stock of clothing at prices that demanded a material advance to the retailer, but early in the year when his representatives went on the road and interviewed his clientele he discovered his mistake. It was too late, however, to secure any large quantities of merchandise on duplicate orders and as a consequence stocks of clothing were reduced and the market was in a very healthy statistical position. The buyer's attitude toward the primary market ever since this experience has been one of anxiety to secure the merchandise ordered. As a consequence price has been a secondary consideration. It is true that in a great many instances a larger volume of orders was placed than was warranted by the clothier's ability to market goods. It was known, however, that these orders were given on the assumption that they would be only partially delivered, which was later proved to be correct.

MANUFACTURERS ALLOT GOODS

One of the conspicuous features of the year has been the change in attitude of the selling agent. He has assumed an independence which was very different from his meek submission to all sorts of claims and abuses before the war. With the elimination of foreign competition and the demand for merchandise from abroad, as well as from the American Government, the possibility of cancelations and claims did not enter into consideration by the seller. His treatment of the clothier, while not as arbitrary as that which the latter has been noted for in the past, was at the same time sufficiently independent to cause many complaints on the part of customers and in certain instances these complaints were justifiable. It was proved that in a certain few instances sellers had refused to deliver goods on contract where the clothier by his foresight had purchased at a comparatively cheap figure. These same goods were delivered later to the more dilatory buyer at a higher price and naturally at a larger margin of profit. It is encouraging to remark in this connection, however, that cases of this character which could be proven were comparatively few and that the manufacturer and his representative used every effort to treat buyers with the consideration that they deserved.

ENTER THE WAR ORDER

All this, however, was before the United States Government began its demand for men's wear merchandise to uniform its soldiers and sailors. When the War Department began to place orders there was a distinct change of heart as far as civilian business was concerned on the part of many agents. There were those who took advantage of the secrecy with which these orders were placed to intimate that they would be unable to make their deliveries to the civilian trade because of the demands upon their machinery by the Government. Such declarations were accepted in good faith and in the majority of cases were found to be the truth, but there were exceptions where buyers discovered that the specific manufacturer had not received war orders, but was only hoping to obtain them and to secure a larger margin of profit in supplying uniform cloths than in filling the contracts which he had taken with his regular customers. This discovery was coincident with the statement made in official sources that a much less percentage of the woolen machinery of the country was engaged on war orders than the trade had been given to believe. This proved, if such proof was necessary, the deleterious effect of the policy of the War Department in purchasing without formal bids being called for and opened in the regular way that has been pursued for many years. This change of policy, it was argued, was necessary in order to prevent a runaway market in wool manufactures. It was contended that if each transaction were made public there would be a constant demand on the part of manufacturers to secure more for every subsequent order, but that under the secret bid it was possible to do a certain amount of trading that would effect a saving for the Government. Whether this has been the result of the Army Department's course or not, it is certain that secrecy had a depressing effect upon the market early in the year and led buyers to withdraw on the belief that there was plenty of merchandise which they could secure as their needs demanded it.

GOVERNMENT NEEDS ENORMOUS

As the war continued, and it was seen, that the forces to be called into action would be more than a nominal number, it became evident that the requirements for their equipment would be far and above anything that had been anticipated. It has been developed lately that even the Quartermaster's Department did not know the number of troops that it would be necessary to provide for, and that their estimate fell short of the necessities of the occasion. Nevertheless, with each succeeding report of the National Association of Wool Manufacturers as to the amount of machinery engaged on war orders, it became evident that a very sizeable proportion of the country's wool machinery was engaged upon this class of work. It seems now in retrospect as though it would have been a much easier task for those responsible for securing the necessary equipment had they allowed the quantities and the qualities necessary to be made known generally so that those who were adapted to the manufacture of these goods could offer their machinery without being urged to do so by committees appointed to assist Government officials.

THE INDUSTRY PATRIOTIC

With the appointment of a committee of woolen men to co-operate with the Council of National Defense in the purchase of army equipment of a textile character there sprang into being machinery that had been a most potent influence upon the market ever since. This committee gave of its time and energy in an effort to obtain for the Federal Government the best possible merchandise at the lowest possible price consistent with fair returns to the manufacturer. There is no doubt that before the declaration of war with Germany and before the Allies had stopped purchasing in this country to supply their needs high prices and very substantial margins of profit had been obtained by domestic manufacturers in connection with the contracts thus placed. This condition was in direct contra-distinction to the losses which it was stated were made on the first few orders obtained from abroad which were taken primarily to keep machinery in operation. As the size of these contracts appreciated and more and more machinery became involved the manufacturer came to the conclusion that he had an opportunity to reap a handsome profit and in many instances did so. Be it said to the credit of the great majority, however, that when supplies for the United States government were called for the committee cooperating with the Council found a most creditable desire to give the best merchandise at figures that could not be regarded as exorbitant under the circumstances. It may not generally be known, through the modesty of the committee, but it can be stated positively, that as representatives of the industry this committee offered to the Government the facilities of the entire plants in the woolen trade putting them at the disposition of the Government at any margin of profit which they might elect. This offer was in line with a similar proposition made by wool dealers offering their stock to the Government on a basis of prices obtaining in the Boston market of the week previous to July 30. While neither offer was accepted the good faith in which the proffers were made indicated the patriotic desire of the entire industry to do its part in providing the ways and means for winning the war.

SPECIFICATIONS CHANGED

It had long been the policy of the Government to demand absolutely pure wool in its fabrics for uniforming its troops. This policy was continued for some time after the declaration of hostilities, but it was eventually proven that owing to the scarcity of wool and to the necessity of accelerating deliveries of merchandise it would be good business policy to allow some modification of the old specifications. As a consequence it was agreed after various conferences and much consideration of the subject that a certain proportion of the component material of uniform fabrics should consist of shoddy and in order to eliminate the stigma which has attached to this word it was agreed that the term should be changed to reworked wool. In practically all the fabrics for army uses, with the exception of the 16 oz. suiting which is still of all worsted construction, reworked wool enters to a certain percentage, varying from 35 to 50 per cent. It is known that certain emergency purchases have been made which have not been fully up to specifications, but it has been distinctly understood that the Woolen Goods Committee is held in no way responsible for the character of these fabrics which were bought without consultation with them and upon orders of Government officials exclusively.

CO-OPERATIVE COMMITTEES SUPERCEDED

In accordance with a law which provided that no members of any committees having anything to do with the purchase of supplies should be connected with companies either actively or financially which benefitted from such orders, it was recommended early in the fall that the various committees associated with the Council of National Defense should be disbanded and that the industries themselves should appoint advisory bodies to represent their interests and to advise with either the Council of National Defense or those officials appointed to supervise the purchase of supplies. In accordance with this prescribed method of procedure, the woolen goods committee was instructed to disband, and only this week what is known as a War Service Committee, consisting of representatives of the two main associations connected with the trade, were appointed to represent the wool manufacturing industry. The personnel of this committee corresponds largely with the co-operative committee, but several additions have been made to it, enlarging its scope and making it more representative. The old committee and undoubtedly the new one has and will receive the general commendation of the trade for their painstaking and patriotic work and in the record they have made for conscientious and able advice to the authorities.

In pursuance of the work of the Commercial Economy Board the woolen industry was asked early in the war to cooperate in order to conserve the supply of wool by adopting measures through which the consumption of raw material might be lessened and the supply extended. Even before the Commercial Economy Board began its work conservation was in progress in a very real way in the industry necessitated by the determination of manufacturers to lessen the cost of their merchandise. Prices of raw material, labor, etc., had risen to such a point that they faced the probability of many lines being utterly impossible from the standpoint of satisfactory distribution. Manufacturers who had not for a long time allowed a pound of cotton or shoddy to enter their plants had turned out a product in which both materials entered very conspicuously. Cotton worsteds in which the percentage of wool had been reduced to a minimum had been shown and sold freely, but there were still those who contended that their reputation for all-wool fabrics would not permit them to deviate from their established practices and who continued to offer lines without any adulterants. It was generally agreed that manufacturers should increase their product of cotton worsteds and cotton and shoddy-filled goods, and clothiers were asked to cooperate. In certain instances, however, the latter trade did not accept this proposition on the ground that they had spent money and time in building up a reputation for all-wool goods in their garments which

they refused to allow to be dissipated. As a consequence the season in which conservation was first mentioned as a factor did not prove as successful as was anticipated from this standpoint. Later in the year, however, it was agreed by both the seller and the buyer that they would all do their bit in turning out lines both of fabrics and of clothing that would conform to the practices suggested by the Economy Board. They received the cooperation of the cloak and suit houses who agreed to use a smaller yardage in their garments and to combine other fabrics with those made of wool in order to further the practice of conservation.

WOOLEN MILLS SPECIALLY BENEFITED

The preponderance of woolen fabrics taken by the Government has meant that carded woolen machinery as differentiated from worsted has been more fully occupied, and, as a consequence, buyers have found it difficult to secure lines, especially of overcoatings and of wool suitings, that they formerly purchased. Many factors have not been able to put out new lines for the coming heavyweight season in view of the requirements of the Government. Practically nothing in the shape of commandeering has been done and yet in a good many instances practically all of the capacity of plants is under Government supervision with the result that civilian orders have had to be relegated to the background. This has meant that on lines which have been shown for the coming season there has been little difficulty in distributing the reduced supply and it has been necessary to allot goods, giving buyers their pro rata share based on previous purchases. In other few instances lines have been practically sold up before they were opened, though it has been the practice of the majority to show their usual trade, allowing them to give an expression as to the amount of goods needed and subsequently distributing the available supply in accordance with their past operations. This abnormal demand for wool goods has meant a search for carded wool machinery, as well as the purchase of equipment to take care of orders on this class of fabric. With the trend of civilian trade, also toward woolens, there has not been the same employment of worsted machinery. At the same time the operation of this class of equipment on shirting fabrics and on 16-ounce worsted suitings has also lessened the capacity available for the regular trade. This unusual demand naturally has made both manufacturers and the selling trade more independent than in the past. In line with conservation a more or less general agreement has been made to cut down the size of samples and not to deliver reference samples to the regular clothing trade. This means the saving of a considerable yardage and of a considerable amount of money. Other matters of detail involving the conduct of business on a higher plane of operations have been worked out and agreed to by both buyer and seller.

The operation of plants to their capacity has not been possible during the greater part of the year, owing to the shortage of labor through the competition of other industrial plants, and, strange to say, also to the fact that the operative has received a constantly advancing wage. With every increase there has come a corresponding determination on the part of the mill hand to do less. He has been in a more or less independent position in very many quarters, especially in those plants which are located close to munition or shipbuilding enterprises. Competition here has been so keen that the woolen manufacturer has been unable to meet the prices offered by these other industries and has been obliged to see his operatives leave for more remunerative jobs. He has resorted to bonuses and co-operative methods, additional welfare work, etc., in an effort to retain his workpeople but has succeeded only indifferently. Advances have been most radical during the year, but it has been realized that these were necessary not only because of the competition above referred to, but also because of the increased cost of living that applies to labor as well as to capital. Unfortunately there have been instances where in spite of the higher wages paid operatives have struck and in one or two notable cases by such action have delayed materially the delivery of Government goods.

UNPRECEDENTED WOOL COSTS

If the increase in labor is to be regarded as the largest factor causing unprecedented prices for merchandise the high cost of raw material is a close second. While the census of wool held by manufacturers and dealers in this country, taken twice this year, did not show any alarming scarcity of stock, yet it was realized that on certain qualities the prohibition against shipping wool to this country was depriving manufacturers of much needed supplies and that if continued prices would necessarily advance inordinately, even above the levels they had already attained. Great dissatisfaction was expressed regarding the attitude of Great Britain in not allowing wool to come here from Australia, the only foreign supplies of clothing wool being received from South America and South Africa. There seemed to be in this refusal on the part of our Ally a desire to put themselves in a strategic position for the future seizure of markets which they formerly controlled, but which had been largely lost as a result of war conditions. This opinion obtained with even greater persistency when it was realized that were it not for the embargo against the shipment of wool manufactures to this country England by reason of her possession of lower priced wool and of lower labor could compete successfully with American manufacturers for this market, were it not for the additional fact that looms in England were occupied very extensively in the production of uniform fabrics for its own and its allies' forces. It was realized, however, that this was not the only factor which prevented wool being sent to this country and that a very important and determining influence was the inability to secure shipping facilities. It finally became known that England was willing to release a certain amount of Australian wools for shipment to this country and toward the end of the year shipments began to arrive which will be augmented by additional supplies later on. These wools have been sold at auction and in all probability will continue to be so sold, inaugurating what many expect will be a practice similar to the sale of Colonial wools in England. The prices of wool show no possibility of radical softening as a result of these sales and with continued demand on the part of the Government for manufacturers' products there is every reason to believe that values will be maintained at their present levels for some time to come at least.

Dress Goods Reach Unheard of Prices

Manufacturers Share in Supplying Goods for Army Requirements

CONDITIONS, never before encountered, combined to make the year 1917 unique and absolutely without precedent in the history of the dress goods industry. The state of war existing between the United States and Germany; greatly reduced imports and exports; strikes and embargoes, manufacture of Government fabrics, and tremendous advances in prices have served to create a situation without parallel in the minds of the various factors in the trade. Unusual as the circumstances have been the industry as a whole has arisen to the occasion and at the present writing is doing business in conformity with the newly created conditions with the situation well in hand. New and unusual problems have been met and disposed of and the trade is looking forward to whatever 1918 may bring forth in an exceedingly optimistic frame of mind. Manufacturing has proceeded along conservative lines and sales have been conducted in somewhat different fashion than formerly, in that manufacturers have not sold as far ahead as they have been in the habit of doing. Accompanying the ever-increasing amount of Government business there has been a marked movement in the direction of staples and comparatively few innovations in the way of fancies have been seen.

EARLY BUYING

Considerable anxiety was manifested at the beginning of the year as to the possibility of a scarcity of goods. Manufacturers took their time in opening their lines which, combined with the threatened shortage, served as a stimulus to buying. Buyers placed orders of considerable size at an early date and speculated largely as to the extent of business and date of deliveries. Contrary to general expectations deliveries were uniformly on time, while business did not come up to what had been anticipated.

By the middle of the year buyers found themselves well stocked. This was particularly true in the case of cloak manufacturers, many of whom had purchased more heavily than their capital warranted. Retailers realizing this state of affairs held off for lower prices and in a number of instances their patience was rewarded by reductions in price. Few if any recessions in price were noticeable in spring fabrics as the scarcity of goods had by this time become apparent to all.

FEW CANCELATIONS

One of the outstanding features of 1917 in comparison with other years was the situation with respect to cancelations. Whereas in the past this practice had constituted one of the most prevalent and serious of trade abuses the year just concluded witnessed the practical extinction of this objectionable custom. The threatening shortage of merchandise and the rising market served to make the practice of canceling extremely poor business and by the middle of the year it had been virtually discontinued. With prices still on the up-grade and civilian manufacture becoming more restricted by virtue of the ever-increasing demands of the Government there seems to be no possibility of the obnoxious custom being revived, which change in conditions has been hailed with delight by the manufacturing trade.

PRICES ADVANCE

Increased cost of labor, operation and materials, together with the operation of the law of supply and demand have contributed to send prices upward throughout the entire year. Prices were thought to have reached a high level in 1916, but the heights attained during the twelvemonth just concluded were absolutely without precedent and are regarded as high-water marks in the history of the trade. Advances of 80 per cent over prices current in 1916 were common, while even greater increases were encountered in certain quarters. As an example of this development one of the most prominent factors in the trade opened a velour for the spring season of 1917 at $1.45 a yard. This cloth was shown for the fall season at $2.12½ a yard. Another prominent factor opened a fabric for spring 1917 at $1.37½ a yard. This fabric was shown at the opening of the fall season at $1.75; it then advanced to $2 and progressed to $2.12½, ending the season at $2.25. The same cloth was listed at $2.25 at the opening of the 1918 spring season and eventually rose to $2.37½ a yard. These cases in point are indicative of the steady advances which have taken place throughout the year and may be regarded as typical examples.

GOOD BUSINESS FOR JOBBERS

Increasing prices throughout the year proved especially beneficial to the members of the jobbing trade. Buying freely at the outset of each season jobbers have found it possible to undersell the mills for practically the entire year and at the same time to reap a rich harvest for themselves with profits far in excess of those which existed during normal times. In view of the profits thus derived they have been able to purchase from mills at increased prices and at the same time have accorded retailers and cutters prices lower than those asked by the mills and their agents.

RETAIL SITUATION

Retail business which started out well in January diminished as the year progressed and during the closing months the volume of sales had been reduced to a minimum. War time economy has been given as the principal cause for the lessening in consumer demand and this was undoubtedly the reason. During December reports received from buyers of prominent department stores showed that cloak and suit sales had fallen off materially, while on the other hand there had been a steadily increasing demand for trimmings and linings. This would serve to indicate that a large proportion of the ultimate consumers were not buying new garments but were endeavoring to get another season's wear out of the clothing they already had in their possession.

Retail sales throughout the year showed a preponderance of demand in favor of sheer fabrics for dresses and heavier cloths for separate coats. With the exception of the early spring season there was comparatively little demand for suiting fabrics. Reports recently received from cloak and suit houses would seem to indicate, however, that the 1918 spring season will witness a revival in the popularity of suitings. The desire to economize has resulted in exceptional sales of high quality dress goods at retail and it is stated that an ever increasing number of women are having their dresses made at home in an endeavor to save money.

Reason for consumer economy may be found in the nature of the garments placed upon the market by the majority of the cloak and suit houses and the various retail establishments. A large percentage of these garments were fur trimmed and in their very nature did not make for the econ-

(*Continued on page* 321)

Woolen and Worsted Technical Section

Use of Cotton as a Wool Substitute

Men's Summer Suiting Fabric—How Cotton Is Used—Manufacturing Details

CONDITIONS in the wool industry, as pointed out in previous articles, tend to make for a wider use of substitutes. In continuation of the subject of the use of cotton, as discussed in the issues of November 3 and December 8, a men's summer suiting fabric of the carded woolen and cotton class is taken up for consideration.

The particular fabric shown has been proved a very suitable one for the ready-made clothing trade, and has been sold in many different patterns and colorings. It is composed of wool, shoddy and cotton blended together, then carded and spun into yarns. The goods delivered have generally opened out very satisfactorily, therefore it is probable that the same idea of quality and construction will be largely adopted by manufacturers in the samples made for the next lightweight season's business.

The cloth is especially well adapted for outing suits for men and boys, as it is sightly and feels good also is satisfactory in tensile strength. Of course, the price that the article can be sold at adds to its popularity, and as there is little external evidence of cheapness, it is likely to be the preference of a large class of purchasers. It is now the common custom to buy and sell such classes of goods as they are, without any guarantee as to what they are made of or how well they will wear.

DESCRIPTION OF CLOTH

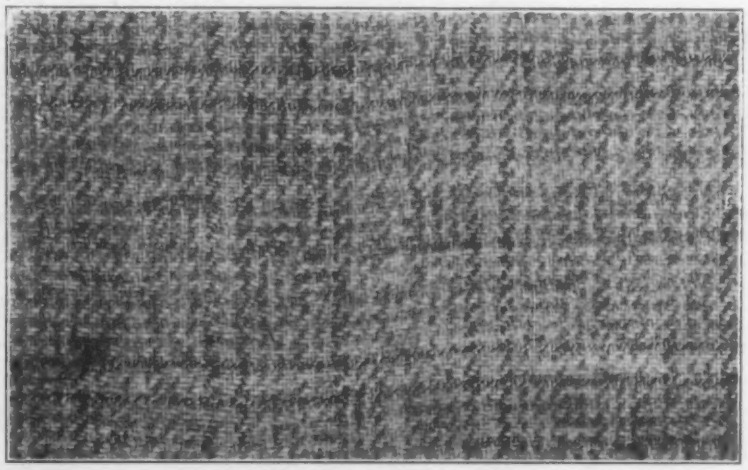
The cloth here illustrated has been one of the best sellers in a range of various colorings, and is selected as the one for reference in connection with the subject. The ground is a light gray shade, produced by separate yarns of white and gray mixtures in about equal parts. These yarns are arranged so as to form a ground pattern of the different shades showing up reversely in blocks about ⅜ of an inch in size. These are broken up by two lines of black and white threads 3-16 of an inch apart, which form an overplaid approximately 1 7-16 inches wide by 1 9-16 inches long. The fabric looks bright and clean, also feels smooth, firm and woolly enough to indicate the presence of the animal material contained in it, which provides cover enough to appropriately clothe the texture. Although the proportion of cotton material contained is much larger than the other two sorts combined, yet this fact is not at all apparent.

CONSTRUCTION OF FABRIC

The question of how best to economize in the use of wool is not a new one as some might suppose, as many practical mill men have studied and experimented in regard to it during the whole course of their career, and it is only on account of exigency that more attention is now being given to the problem. Great progress has been made along this line and manipulation has become a common word in woolen mills; also an important point connected with the work carried on, because the main object still strived for, is not only to produce a good article, but also to do so at the lowest possible cost.

The terms of construction in the case under consideration, demonstrate what can be accomplished in the saving of wool through the means of substitution fittingly made, and the instance may well be accepted as one for guidance in the vital matter referred to in the foregoing. There are 2688 ends in the full warp to be finished 56 inches wide. These, excepting the plaiding threads, are 4¾ runs in size, made from a composition of stock on the following basis, 15 per cent fine medium territory wool, 25 per cent carded shoddy of an equivalent quality to the wool, 60 per cent carded American cotton of good staple. The other yarn is 2/30s black and white cotton, twisted medium hard. There are 42 picks of filling per inch, and the main yarns are the same as those of warp, but twisted a little softer in the spinning. Thus, it is plainly seen that the object sought for and found is an expensive looking cloth, cheaply produced.

To effect the result, the composition of raw material is made capable of being spun to a fine size of yarn, which allows a close and firm texture to be woven. The grade of wool used is well fitted for the purpose, and the shoddy and cotton which conform to it are in-



MEN'S LIGHTWEIGHT SUMMER SUITING FABRIC

creased in efficiency by being carded previous to the blending operation. It may be explained here that another reason for first carding the cheaper constituents is to avoid the danger of receiving specky yarns.

THE WARP LAYOUT

It is essential for the proper width of finished goods that the reeded width of warp should be in accordance with the extent of fulling calculated for the fabric, and this again should be subject to the shrinking or felting capability of the raw material. This is a rule, which if consistently followed, will do much toward having separate pieces of cloth match up closely with the standard sample. Of course, this is done in all well-regulated mills where selling samples are made, as the details of layout are kept carefully on record, and are supposed to be strictly adhered to. In the case in point, the warp is sleyed 64 inches wide inside of selvages, through a 10½ reed, 4 ends in each dent.

As already explained, a design is created on the fabric by reversing the effect formed by the distinct shades of yarn. This is done in a simple way by having the arrangement of yarns in harmony with the plan of weave. The former is on the order of 2 and 2, broken up by a single 4 or its equivalent. The latter is a common 4 harness twill, 2 up 2 down. The change of positions is made by the four threads of same shade, as the straight line effect is caused to show up the reverse way. In such a class of goods, the plan of weave is all important, for seeing that the cloth and its texture must be virtually formed in the loom, it is imperative to adopt the style of weave that will give the most concise and level result. Neither a regular plain nor a fancy weave are suitable for the purpose, because the one gives a fabric that is too tight and hard, and the other yields one that may carry the same objections, also those of lumpiness, or floating threads. The weave chosen cannot be improved upon, as the workings are effectual and consistently even throughout.

BLENDING AND COLORING

The light grey mixture shade of yarn is made up with 15 per cent white wool, 60 per cent white cotton, and 25 per cent black shoddy, thus the latter is the featuring shade in the yarn, and the effects are noticeable in the cloth in the appearance of black specks, although not so numerous as to be a cause of objection. It is not according to the best approved plan, to have the least valuable material in the most prominent place, but in this instance it cannot be avoided without increasing the cost to produce, and in any event, the use of white shoddy for such a purpose is never advisable. The price of a sort at all fitting will not be a great deal less than for wool, and it will probably be faulty in one or more respects.

As the goods are sold as fancy cassimeres in the regular way, the samples are shown in books or ranges of distinct styles, made in the same quality of fabric. This necessitates the getting up of sample blankets, which is the especial work of the designer, who blends distinct colors or qualities of stock together to suit requirements. Taking the reference sample to illustrate, it may be termed Style 1. Then supposing that five more styles are wanted in different colorings to make up a range, these can be got in the same depth of shade by substituting distinct dark colors for the black. Of course, the depth is varied in general practice, but it is inferred here that the pattern design is required to be maintained at a uniform strength, otherwise there are likely to be run around pattern effects created. But this is avoided when selections are made from the blanket.

MAKING THE YARNS

It is customary to purchase territory and such like wools in the grease, as the actual value can be more positively ascertained than when in the scoured condition, and as there are conflicting opinions regarding how the scouring should be done, manufacturers generally prefer to act according to their own ideas. However, there are few doubts about the fact that the wool should be completely opened out from its tangled state and freed from the gummy matter attached, without any degree of felting being caused. In respect to the shoddy, it can either be bought in the prepared state ready to use, or made in the home mill from the natural rags, purchased from another concern. It is best to tear them up before dyeing, as by doing so the dye penetrates the material in the most thorough manner.

The same care requires to be taken in the coloring of shoddy as for wool, and owing to the shorter and more depreciated condition, there is greater danger of injury being done in the process. Dyeing by machine is the best method, as the stock is treated more uniformly than in the old way, and also at a lower cost. The cotton also requires to be opened out before being used in a blend to be carded. This is done in some mills by a machine designed for the especial purpose, but the mixing picker is commonly utilized to do the work.

Again, the gray mixture yarn of the reference sample is used to illustrate the method recommended to be followed in making up the batch. First layer, one-half of the cotton; second layer, all of the shoddy; third layer, the balance of cotton; fourth layer, all of the wool. Then apply the oil in emulsion form, and run the stock through the picker in two operations. To obtain good carded roving from a blend containing so much cotton, the clothing on machines must be competent to control the fine and delicate fibers composing the material. The gauge of card wire is not likely to be too fine, but if it is appreciably too coarse, the cotton will sink in the clothing and make a mess. It is also essential to maintain the wire in a sharp condition, as in this case, keen rather than prolonged carding is necessary.

FINISHING THE FABRIC

The idea of imitating a wooly cloth in a cotton quality is continued in the finishing of the woven material.

Fulling is the next process, and is not prolonged over 1½ hours, when the felting power of stock is pretty well exhausted. Washing and drying is done as soon as possible after fulling, to avoid the danger of staining. Shearing is done on the face, but only for the purpose of squaring the nap.

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Recovery of Potash from Wool Scouring Waste*

Every Mill Should Study Problem as a Means of Relieving Situation—Costs and Prices

By *Robert Spurr Weston***

IN 1913 there were imported into the United States 267,970 tons of potash salts; in 1914 only 171,798 tons. Since then the importation has practically ceased and the country has been forced to depend upon accumulated stocks of foreign potash and the small amounts resulting from the hasty development of native sources. To make matters worse, considerable high grade potassium sulfate has been exported to Cuba to meet the peculiar agricultural necessities of that fertile island. Geheimrat Dr. Wilhelm Ostwald remarked, as you know, that because Germany, having "a world monopoly of potash, can dictate which of the nations shall have plenty of food and which shall starve, America went into the war like a man with a rope around his neck, a rope which is in enemy hands."

Realizing the serious consequences of a long continued shortage and the probability of a long war, both the Government and private interests have devoted a great deal of energy to the development of native potash sources, such as natural salts or brines; alunite and silicate rocks, including cement kiln dust; kelp; wood ashes; molasses; distillery waste, and miscellaneous organic sources, among them wool scouring waste.

The result was the production in 1916 of 9,720 tons of potash (K_2O), almost ten times the amount which was produced in 1915. Good as this result has been, the total product cannot satisfy more than 5 per cent. of the present want; consequently it is imperative that everyone make a determined effort to develop even temporary sources of supply.

So far about 40 per cent. of the amount produced has come from the alkaline lakes in western Nebraska. There is, however, the large store at Searles Lake, California, which holds 20,000,000 tons in solution, and which promises to be the most important native permanent source yet discovered. The original enterprise at Searles Lake was in the hands of the American Trona Co. At present the chief development is under the joint auspices of the Pacific Coast Borax Co. and the Solvay Process Co. It was hoped that this plant would be in operation about April 1, 1917, but the project has suffered so many set-backs, technical and otherwise—recently there has appeared an account in the newspapers of a severe fire at the works—that its product has not yet been sold to any great extent. Furthermore it was stated that it will be necessary for the Government, which owns the lake, to spend $1,000,000 in preparation before the companies can operate; but granted this, the project, backed as it is by corporations experienced in the manufacture of chemicals, and furthered by the National Research Council, will undoubtedly become a practical success. It has been stated in the newspapers that the two plants will produce about forty tons of potassium chloride daily in the form of a 70 per cent. product.

Other sources are promising, some of them only under present high price conditions; perhaps one or two are practicable under normal conditions. There are also some sources which can be developed so as to operate profitably under normal conditions, provided the first cost of the plant can be amortized during the period of the war.

POTASH PRICES RISING

The rises in price of potash have been staggering; 80 per cent potassium carbonate, which sold for 6 cents a pound before the war, is now quoted at 70 cents, and the price is apparently rising. The certainty of an increase in price, at least until the Searles Lake salts are marketed, is apparent to all who realize how necessary is potash, not only for agriculture, but to the manufacture of certain soaps, high grade glass, chlorate matches, some explosives, a few dyes, and for photography, tanning, medicine, etc. While the equivalent sodium salts may be used in place of potash, and in many cases where it was once believed that potash salts alone would do, there remains an insistent and definite demand for potash which nothing else will supply.

This is entirely outside of the agricultural field, where potash is so much needed if the soil is to be saved from exhaustion. While it is true that virgin soil and the rotation of crops may for a time permit fair yields of those agricultural products which require a great deal of potash, there is a limit which may not be passed without disastrous consequences. At present potash fertilizers are rarely obtainable and sell for exorbitant prices—about $400 per ton of K_2O being the average, as compared with $50 or less before the war.

POLLUTION OF STREAMS

For many years the speaker has been interested professionally in the engineering and scientific problems connected with the cleaning of rivers, and has devoted a great deal of attention to the disposal of factory wastes, among them wool scouring waste. He has appeared in court to defend mill owners discharging this waste into a river and has been employed on cases where his client was damaged by this discharge from a mill above.

Wool scouring waste is not simply a potash solution, but one of the most befouling and greasy liquids which streams receive. If discharged unpurified, it befouls the banks and bottom, and causes the growth of dense masses of aquatic vegetation which subsequently becomes covered with wool fat, dies, disintegrates, becomes detached from the banks and bottom of the stream and drifts down to damage the property of riparian owners.

One case in point was a bleachery, said to be the largest of its kind in the country. Here grease spots on the finished cloth caused damages at the rate of several thousand dollars a month, until the wool scouring waste discharged by three mills above was purified. In another case, the discharge of wool waste prevented the dyeing of delicate fabrics. In still another, the waste befouled a stream so much as to cause a down-stream mill to shut down a part of its plant until the water could be filtered before use.

The condition of such rivers as the Merrimac, the Blackstone and the Passaic is too well known to comment upon. Notwithstanding that they are large streams, they are so polluted as to be useless for many industrial purposes unless the water be first purified.

Even when wool scouring waste is discharged into a sewer connected with municipal disposal works, it will, unless greatly diluted, cause many types of disposal beds, especially intermittent sand filters, to clog rapidly, and to become useless. Hence the difficulty of the sanitary engineering problem of wool scouring waste disposal. The waste befouls the rivers unless treated, and works designed for the purification of domestic sewage may be unable to dispose of it.

METHODS OF TREATMENT

Until the great war, the only practical method of treating wool scouring waste was to precipitate the solids with sulfuric acid or sodium acid sulfate. The precipitated sludge was then dried on sand beds and the grease was recovered therefrom by pressing in steamjacketed, hydraulic presses. This method produces an acid wool grease or so-called acid dégras. It is now worth 9.5 cents a pound and may be produced for less than 4 cents. The potash in the supernatant liquor is in the form of sulfate. However, the liquor contains much mineral matter and free acid, and no method has yet been devised to recover the potash economically. The liquor can be discharged into a stream, although filtration may be necessary if the stream be small.

Since the war, the old fashioned acid or "cracking" process just described has been modified, in this country, chiefly through the efforts of E. I. du Pont de Nemours & Co. The improvement consists first in allowing the waste to flow over solid nitre cake, a cheap and abundant waste product. There instead of precipitating the greasy sludge to the bottom of the treating tanks, the waste is so treated in a continuous subsiding basin that the grease rises to the surface in the form of scum. This is skimmed off, the acid neutralized with sodium carbonate, and the whole heated to boiling. The use of soda separates the dirt from the grease and avoids the necessity for presses. The grease and soap are then skimmed off, re-acidified with nitre cake, and the acid grease is clarified by allowing it to stand over acidified water in the usual way. This process produces a very light colored grease, and the liquor is of nearly as good character as produced by the old fashioned process.

This continuous acid process, like the older one described above, produces a waste from which potash may not be recovered economically. There are other methods of treating wool scouring waste, however, and the war prices have given sanitary and chemical engineers an opportunity to try them. Many have been known for a long time, but have been considered impracticable on account of the low price of potash. Among the many considered, three main types may be described.

1. Precipitation Process. This consists in first settling the waste to remove sand and other settling solids. Afterwards the settled waste is passed through a centrifugal machine to remove the free fat and the finely divided suspended matter. The solids in the machine effluent are then precipitated by chemicals and the sludge so formed is dried, using filter presses, or if necessary hot air dryers.

A low-grade grease is then extracted from the sludge and the latter is ground and dried for use as a fertilizer base. The filter press effluent is then evaporated, calcined in a rotary furnace and the potash recovered by lixiviation.

2. Cardem Process. This is a process which has been successfully employed to reduce sulfite pulp liquor and tanning extracts to a powder. The apparatus consists of a series of chambers through which hot flue gases are passed and into which the settled and machined wool scouring waste is sprayed through special nozzles. The process is in two stages, known as the wet chamber and the dry chamber, respectively. If a dry product is to be secured, the concentrated waste from the wet chamber must be degreased by solvents. The dried product, quite hydroscopic, may be used without further treatment or may be concentrated to a liquid containcover the potash. The dried product may be coked and lixiviated.

3. The settled and degreased liquors may be concentrated to a liquid containing 75 per cent of solids using an evaporator especially designed to prevent foaming and scaling, and the concentrated liquor coked in an open furnace, after which the potash may be removed from the coke by lixiviation. This process is facilitated and made more profitable by degreasing the concentrated liquor before coking or by washing the wool in naphtha.

It may be noted that in all of the processes just outlined, the first steps are the subsidence of the waste to remove the settling solids, and its passage through a centrifugal machine to remove the free fat and coarser colloidal suspended matter. The degreasing process by itself is profitable. The grease recovered by the machines sells for an average of 10 cents a pound and the better grease may be used for the manufacture of lanolin, which is now worth 41 to 46 cents a pound.

In the writer's opinion, it is the centrifugal machine which makes the recovery of potash possible. Former attempts to recover potash from wool scouring waste failed because of the formation of an impure, vitreous potassium silicate during calcination. The potash in this vitreous silicate is insoluble in water and its recovery from the ash is as difficult and the cost as prohibitive as from a natural silicate. During the last year, cokes which contain 95 per cent. of soluble matter, consisting almost entirely of potash salts and sodium carbonate, have been produced from settled and centrifugalized wastes. During the war, the "potash" produced will contain sodium as an impurity because of the decrease in the use of potash soaps in the wool scouring process.

WOOL SCOURING PROCESS

Another essential improvement has been made in the mill scouring rooms, where a great saving in water and consequently a greatly increased concentration of both grease and potash has been effected. Except in two cases where the wool is degreased by the naphtha process and subsequently washed in water without soap, the American mills wash the wool in so-called trains of from three to five bowls. Formerly nearly all of the mills used clean water to refill the bowls, but where recovery methods are practiced, it is quite essential that the washing process be conducted on the countercurrent principle—that is, the first bowl only should be discharged to waste, and it should be refilled as far as possible from the sec-

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* Paper read before New York Section of the Society of Chemical Industry.

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ond bowl, the second from the third, the third from the fourth, etc. Thus the wool and the water will pass through the train of bowls in opposite directions and the minimum of water will be used.

Where potash recovery is practiced abroad, the so-called desuinting process is used—that is, the wool is first soaked in water which dissolves out the potash, and then the solution is evaporated and calcined. In America, however, this process is seldom used, largely on account of the extra machinery and attention required. Usually the wool, soap and other detergents are introduced into the first scouring bowl, while water alone is used in the remaining bowls. In most mills the contents of the first bowl are used until they become so dirty that they must be changed.

Instead of using alkali and soap in the first bowl, one mill omits the soap and adds it to the second bowl, thus producing a first bowl discharge much more suitable for the recovery of grease and potash than if soap were used. The discharge from the second bowl may be treated by the acid process if the unpurified discharge would injure a stream; otherwise, it would hardly pay to treat it even in war times.

One mill has tried the plan of using over again the settled and centrifugalized waste discharged from the first bowl and has been able to do this three times and still produce a properly scoured wool. The water saved in the first bowl is passed through the end of the train, thus cleaning the wool without diluting the waste. In this way the waste can be concentrated to several per cent of solids.

In a few mills water and soap solution are passed continuously through the train of bowls. This would seem to be the ideal method of using water if by-products are to be recovered.

For the recovery of by-products, the best method of washing wool is the naptha process. Naptha washed wool is subsequently washed in water and the waste produced is free from grease and easily concentrated. It can be evaporated to dryness without difficulty and calcined to produce a coke containing as high as 45 per cent of potash.

The various processes outlined have all been tried out in practice. The first, the precipitation process, is too expensive on account of the large amount of chemicals required to precipitate the suspended matter, and too complicated on account of the fifteen or more distinct operations necessary.

The Cardem process is very promising, and we have tested it quite thoroughly, using the greaseless waste from naptha washed wool. Undoubtedly where waste flue gases are available, it can concentrate the waste more cheaply than any other process and has the further advantage of causing little loss by entrainment. Unless degreased, the waste cannot be evaporated to a dry, friable mass in this evaporator, and even if the waste from the wet chamber be degreased before its final concentration in the dry chamber, the product is very hydroscopic. Consequently it must be coked before it can be used directly as a fertilizer or before it can be lixiviated for the recovery of the carbonate. Where waste heat is available, the wet chamber of the Cardem apparatus can take the place of the multiple effect evaporator, but if the dry chamber be used the final product ought to be coked, and it may prove best to do the final evaporation and coking in the same apparatus—usually an open, fuel-oil heated pan.

PROCESS USUALLY RECOMMENDED

The process which is usually recommended is to evaporate the machine effluent in a triple-effect of proper design, or Cardem wet chamber, degrease the concentrate with an immiscible solvent, distill off the solvent from both aqueous and solvent layers and then coke the aqueous concentrate in an open pan heated by fuel oil. The concentrated mass takes fire during coking and incinerates to a porous, gray, non-hydroscopic solid which may be ground and lixiviated for the production of a nearly colorless and nearly silica-free solution of potassium and sodium carbonates from which the potassium salt may be recovered by fractional crystallization. At present the coke finds a ready market in the fertilizer industry. It usually contains 20 per cent or more of potash as K_2O.

There were many practical difficulties which had to be overcome before the waste products could be recovered economically. The centrifugal machine took care of the silica, but the evaporation of a soapy, alkaline liquor in an evaporator was a real problem, and for this reason the Cardem apparatus promises a satisfactory solution, although the first cost of the plant plus royalty is higher than the first cost of an evaporator.

The first and second evaporators tried were of the ordinary tubular type with the vapor spaces about twice the usual volume—that is, the effects were nearly twice the usual height. One of these evaporators, having each effect 4.5 feet in diameter, had vapor spaces 9.5 feet high. Notwithstanding these liberal allowances, the liquor foamed so much in the first two effects that it filled the vapor spaces with a mass of bubbles, many of them 6 inches in diameter. This foaming was attended with loss of liquor and low efficiency. The first evaporator tried was about 50 per cent efficient. The second was ordered amply large to make allowance for foaming. It was then learned that the bubbles can only be broken up by high vapor velocities, and at present two evaporators embodying this principle are being tried. One of them is reported to be operating efficiently and economically; the other has not yet been tested.

The evaporation problem has been solved satisfactorily. With proper apparatus, triple effect or wet chamber, degreased waste may be concentrated at 65 per cent of solids. It is not usually practicable to obtain this concentration in a triple effect. It is necessary to use a small finishing pan or open kettle for the final concentration. This is because the boiling point of the waste rises rapidly above concentrations of 55 per cent. In the Cardem chamber the liquor is sprayed into the chamber, over and over again, until concentrated sufficiently.

Degreasing by immiscible solvents presents no unusual or unfamiliar difficulties, and these are easily overcome. A large ratio of solvent to waste must be used; otherwise the solvent will not separate from the aqueous liquid. No untried apparatus is necessary for the recovery of the grease and the warm product from the evaporator treating the aqueous portion is fluid even at high concentrations.

As mentioned previously, the degreased liquor may be concentrated to 65 per cent of solids. One sample of concentrate which was not degreased had the following composition:

Concentrate from Evaporator

Specific gravity	1.158
Total solids	37.1%
Ash	15.5%
Fats by ether	5.9%
Potash, K_2O	7.0%
Boiling point	104.3° C

This analysis represents the minimum degree of concentration which is practicable. The process of degreasing reduces the water content and the residual potash liquor then may have the following composition:

Degreased Concentrate from Evaporator

Specific gravity	1.38
Total solids	65.0%
Ash	29.0%
Potash, K_2O	13.4%
Fats by ether	0.7%
Boiling point	126° C

The concentrated liquor readily cokes to a porous solid containing from 40 to 46 per cent of potash as K_2O. One sample of coke produced from waste from naphtha scoured wool contained 46.3 per cent of potash, and its ash had the following composition:

	Per Cent
Soluble in water	95.2
Potassium carbonate	77.3
Equivalent K_2O	50.0

The calcined coke from ordinary wool waste using soda soap (potash soaps have scarcely been obtainable since the war began) had the following composition:

	Per cent
Soluble in water	88.5
Silica	3.5
Potassium carbonate	44.9
Sodium Carbonate	40.0

To recover the grease, the waste, first heated to 60° C or above, is allowed to subside for several hours in a tank. The settled waste is then reheated to 72° C and passed through centrifugal machines, where from 40 to 70 per cent of the other soluble fats are removed. The hot effluent should then pass directly to the evaporator to avoid loss of heat.

The grease from the machines contains from 5 to 20 per cent of water and some colloidal suspended matter. It is re-emulsified and remachined to produce a grease containing less than 2 per cent of water and practically no suspended matter.

The quality of the centrifugal grease varies greatly, depending upon the grade of wool washed and the care exercised to prevent fermentation of the waste during sedimentation and degreasing. The best grease is produced from Australian wool and the worst from the dirty Territory and domestic wools. U. S. P. lanolin can be made from the best grease, while the cheaper greases are used for stuffing leather, lubrication, veterinary ointments, etc.

The grease recovered by the solvent process is dark colored and contains many organic impurities. Its odor is pronounced and it is used chiefly for stuffing leather, for cheap lubricants, and in general for those purposes where acid wool grease is employed.

COST OF RECOVERY

The average wool scouring plant perhaps has two trains of bowls discharging 12,000 gallons or 200,000 pounds of waste daily. The cost of a plant for the disposal of this waste will vary greatly with conditions, but will rarely if ever exceed $40,000, even at the present high prices.

The 200,000 pounds of waste will on the average contain 4000 pounds of grease and 2500 pounds of potash, and there may be recovered therefrom 2000 pounds of centrifugal grease, 1750 pounds of extracted grease and 1600 pounds of potash. The cost of operation is approximately as follows:

	Per Diem
Cost of centrifugal process	$45
Cost of evaporation	48
Cost of degreasing	35
Cost of coking	17
Management	20
Total	$165
Value of Products	
2,000 lbs. of centrifugal grease @ 10c.	$200
1,750 lbs. of extracted grease @ 8c.	140
1,600 lbs. of Potash @ 17.5c.	280
Total	$620
Daily profit	$455

This profit may seem large, but one mill operating three trains of bowls is at present making a profit of $500 a day on centrifugal grease alone, and it is believed that at present prices a plant may be built and amortized before the end of the war. At pre-war prices, the cost of operation would be slightly less and the value of the products $184, thus leaving a small profit for a plant of this size. In the case of a small, single train plant, the pre-war profit would have been a nominal one but the stream would have been kept clean and valuable products would have been reclaimed from a waste otherwise a nuisance. It must be borne in mind that when potash is recovered no waste is discharged into the stream, while the degreasing plant alone greatly improves the character of the polluted stream.

The waste has another set of possible by-products, namely, those produced by the destructive distillation of the coke—among them some valuable waxes of high melting point, and possibly other commercially valuable substances. However, these possibilities have not yet been sufficiently studied for one to give an opinion regarding their value.

This paper deals of course with a general problem, but just as wools vary, so do the applications of the process in specific cases. Therefore each case, beginning at the scouring room and ending at the stream into which the waste is discharged, must be studied with care before decision can be made regarding the practicability of recovering valuable by-products from the waste in question. Every plant should make this study that the dearth of wool grease and potash formerly imported may be in a measure relieved.

The Fulling of Wool Army Goods

How to Secure a Compact Felt—Soap, Heat, Mill Wrinkles and Rolling Selvages

By Olin Fisk

THE finishing of army goods that require a melton or semi-melton effect, is very largely dependent upon close attention to the details of the fulling process. To secure a good melton finish requires, first of all, that the selection of stock and construction of the cloth be suitable to the end desired. Stock that is deficient in fulling quality or a construction in the loom that renders the fulling difficult, will tend to baffle the best efforts of the finisher and result in a poorly felted, if not tender fabric.

As the Government specifications call for a definite number of ends per inch in both warp and filling, and pretty closely laid, the designer should know something regarding the possibilities of the stock and construction as they pertain to the final result. He should allow in his calculations for a suitable shrinkage in length as well as in width, so as to secure a compact felt and a suitable covering for the face of the cloth. This shrinkage should not be less than six per cent.

Even when the cloth comes to the finisher with all the conditions in his favor, there will be a need for the exercise of skill and constant care in order to secure the best possible results. For owing to varying conditions, no definite rules of action can be relied upon in the finishing department.

The strength and quality of the soap

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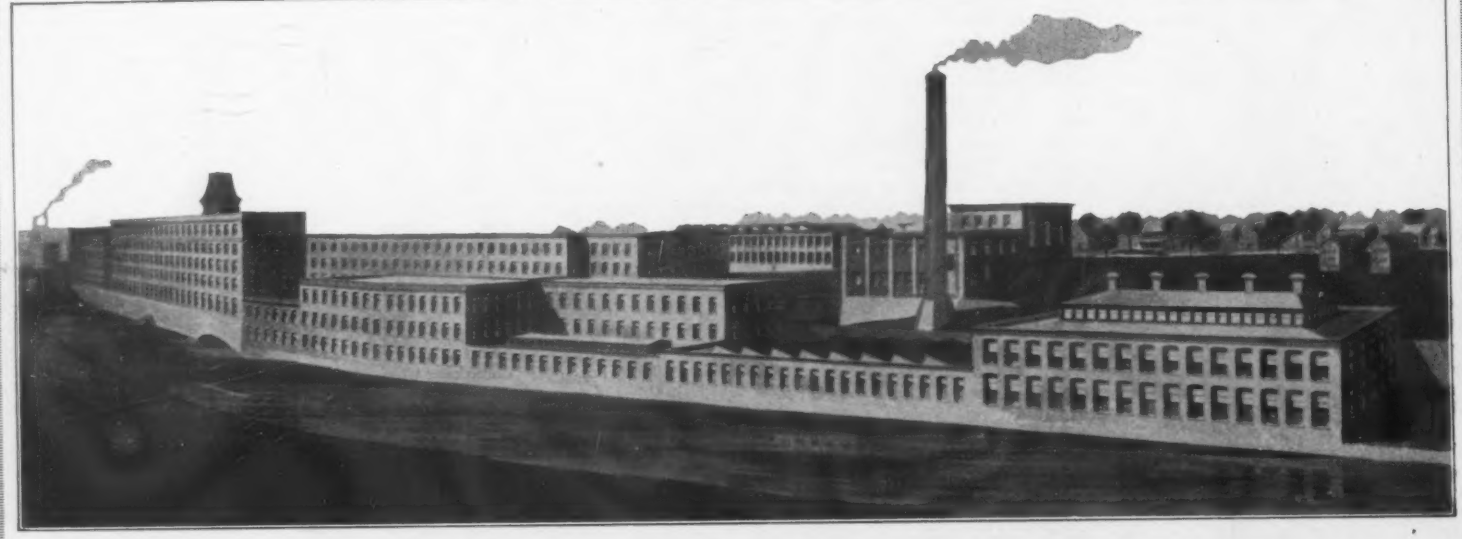

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and its preparation for use, the proper moisture of the goods and a careful regulation of the temperature, are matters that must be attended to and trouble is bound to follow any haphazard or slipshod methods. No rules can be relied upon as to the alkaline strength of the soap, as it depends very largely upon the kind and quality of the oil and upon the stock in the carding. It must be sufficient to overcome and saponify all the grease contained in the goods, by which action the grease becomes a part of the soap, to aid in the fulling instead of being a hindrance, as it always is if not removed or properly overcome.

An insufficient quantity of alkali will result in imperfect fulling and possibly dirty goods, while an over amount may injure the colors and tend to give a harsh feel to the finished cloth. By a careful study of the work, the practical finisher should be able to adjust the strength of his soap to suit the case in hand.

The body of the soap should be sufficient to hold in suspense all the impurities contained in the goods, and retain a creamy appearance throughout the fulling process. If, when wrung from the cloth, it runs thin and watery, this condition indicates that a better body is required.

In preparing the soap care should be taken to thoroughly dissolve all the ingredients and then give a slow boil for at least three hours. Soap not sufficiently boiled will often go to pieces, become watery and fail to give good results.

The moisture of the cloth should be very carefully regulated. If run too dry the cloth will fail to produce a perfect felt, will chafe and wear away, and present an open and frowsy appearance when finished. If run too wet it will have a spongy instead of a good firm felt, and there will be danger of damaged goods by the cloth clinging to the rolls and pinching beneath the toe of the traps. As a rule the cloth should contain all the soap it will carry without its appearing on the surface or throwing off. Goods requiring several hours' fulling will need additional soap to keep them in good felting condition. When the moisture is right the soap will start from the cloth by wringing it slightly.

REGULATING THE HEAT

Other conditions being favorable, the fulling is hastened in proportion to the heat generated during the process, but extreme heat should be avoided as it is likely to prove injurious, both to the strength of the cloth and the life of the colors. When the stock is of good felting quality, slow fulling will produce the best felt as the fibers are more firmly knit together than if the shrinkage is hastened by more heat. For this reason the temperature should be carefully regulated on this class of work.

The soap should be used cold and the mills should be closed until the temperature arrives at the proper fulling point, when if necessary the doors may be opened sufficiently to keep the temperature as required. This ventilation should depend somewhat upon the general temperature of the room and the season of the year, the point being to avoid over-heating and to keep the goods at a good fulling and uniform warmth.

If the quality of the stock or the construction of the cloth renders the goods difficult to full, a higher temperature may be desirable to advance the work. Too slow fulling of goods of this character may lead to a chafing of the cloth, which by all means should be avoided.

In the selection of pieces to be run together, they should be as nearly equal in length and weight as possible to avoid the possibility of one running alone any length of time, which tends to a lack of uniformity. They may be run double or single, as the finisher may deem best. If run double they should be run into the mill to a mark made for the purpose, designating the middle or one-half of the cut, when the end already entered should be started in again, and the remaining half of the cut run in and the ends sewed together. This results in the piece being run twice around the mill, not only increasing the speed of the fulling, but doubling the bulk of the cloth between the rolls, producing a better cushion effect which is a decided advantage in producing good results.

SHRINKING IN LENGTH

In trapping the goods for shrinkage in length, care should be taken not to hasten this part of the work. The length of time the goods will run should be approximately determined, and the shrinkage in length regulated so as to continue during as much of this time as possible. In other words, the shrinkage in length and width should continue together as nearly as possible throughout the process. This gives a more complete and perfect knitting together of the fibers of warp and filling, than if the shrinkage in length be unduly hurried.

WRINKLES, ROLLING SELVAGES

Among the difficulties most commonly met in fulling this class of goods are mill wrinkles and rolling selvages. As a means to avoid the former, care should be taken in sewing the ends of the cuts together, as a coarse or careless sewing will tend to start wrinkles that will extend well into the cloth. If possible, a mill sewing machine should be used, which insures a smooth and perfect seam. The cloth should not be too closely confined in guides or pot eyes or drawn by stretchers, but should be given all the chance possible to open and change the lengthwise folds as it passes from the bottom of the mill to the pressure rolls. Added to this a frequent shaking out will break up the wrinkles and change their positions before they become too set.

For rolling selvages, the only real remedy is in their character and construction. If either the stock or weave permits them to shrink more readily than the body of the cloth, they will soon become tighter, when the rolling cannot be checked. By the use of a double and twist, or a yarn with a percentage of cotton for the selvages excessive shrinkage may be avoided and the trouble averted. The tacking together of the selvages will also tend to correct both mill wrinkles and rolling selvages.

The suggestions here given should, if carried out, result in a close and desirable felted cloth and a smooth, well covered face.

Moisture Content and Some of Its Effects

Abstracted from Paper Presented at Annual Meeting of American Society of Mechanical Engineers

By *William D. Hartshorne*

With materials as valuable as silk, wool, flax and cotton, and such of their products as are sold by weight, the actual weighing of the moisture they may happen to contain at the time of sale is of evident importance to both buyer and seller, when it is once understood what slight changes of circumstances can cause a loss or gain in weight involving thousands of dollars in many every-day transactions.

THE investigations recorded in this paper were begun in a comparatively crude way for a strictly limited commercial purpose, but it soon became apparent that a fundamental study of the subject of moisture content of materials was needed in all branches of textile manufacture.

The relative equilibrium of the moisture content of the fiber to the surrounding atmosphere was evidently the key to at least one phase of the problem. When the laws of equilibrium relating to weight had been definitely established, and when, as relating to dimensions, the fact had been demonstrated that the effect of absorbing moisture upon both wool and cotton fibers was not only to swell them but to lengthen them, rather than shorten them, as had sometimes been erroneously contended, one of the most important conditions for good or bad work at the spinning frame became evident and demonstrable.

The smoothness and evenness of a thread are dependent upon the relation of its moisture content to the surrounding atmosphere at the time of spinning; and many of the hitherto puzzling defects in a finished fabric are explainable, and the remedy or method of prevention rendered obvious, as soon as the correct relationship of these facts to weaving and fabric-finishing conditions is apprehended.

Moreover, the effects of moisture content upon strength and elasticity are not less important, both in manufacturing processes and the commercial use of textiles. This may be illustrated by the comparatively recent observation that the strength of the standard make of cotton tire fabric (and other cotton fabrics have been shown to follow a similar though not identical law) increases approximately 7 per cent for each 1 per cent increase in moisture content, reckoned from the bone-dry state, up to (curve not yet accurately determined) approximately 8 to 8½ per cent.

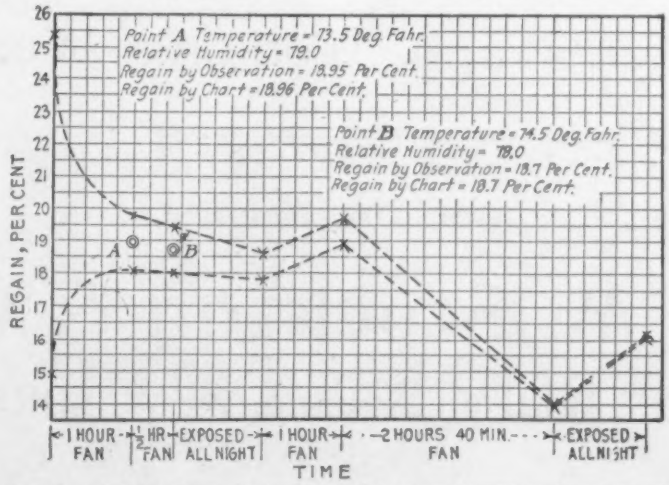

FIG. 1. LAGGING EFFECT IN SKEIN TAKING UP OR PARTING WITH MOISTURE

The most significant effects of moisture content upon textiles may be classified under three general heads:

I Weight.
II Dimensions.
III Strength and Elasticity.

Under these respective heads, among the different textile materials there is great diversity of effect, and as a consequence a great divergency in unverified opinion. Research has, it is true, established beyond reasonable controversy some of the essential data requisite for further study, and commercial precedent has recognized the necessity for standards in measuring some of these effects; but it is from the economic advance in the manufacture and the skilled usage of such materials that the greatest demand for accurate knowledge is gradually coming.

The most obvious of these effects is weight, and to this factor the present paper is mainly devoted. To conditions causing changes in weight much more effective study has been given than to those causing changes in dimensions or strength and elasticity. These latter are complicated by other factors, such as twist or weave, which tend to increase or diminish the ordinary effects of moisture.

EFFECT ON WEIGHT

In measuring weight, long before any exact causal relationship had been established between the various factors, certain standards of moisture content for the principal textile materials, such as silk, wool, cotton and flax and their manufactured products, had been established by custom and to some extent sanctioned by law in the principal continental markets and in England as a basis for purchase and sale.

Variations in weight between different materials due to their individual hygroscopic properties as affected by atmospheric changes alone were thus recognized, and a standard basis for figuring the standard allowances agreed upon was also adopted and with few exceptions has been steadily adhered to. This standard basis was obtained by determining the average loss in moisture of a series of representative samples from the lot of material in question by drying them in a proper oven at a temperature

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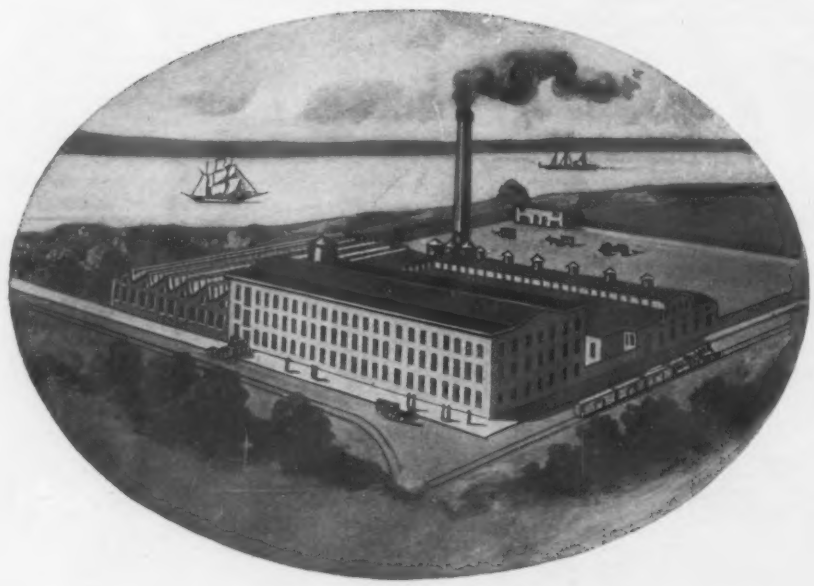

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of 221 to 230 deg. Fahr. until they ceased to lose weight, or until the rate of loss had reached a prescribed minimum.

The standard allowances made upon this "standard" dry basis of weight (sometimes called the bone-dry or the absolutely dry basis) are commercially called "regains," a nomenclature liable to misconception and misapplication which it is important at the outset to avoid both in practical use and theoretical study. The hygroscopic capacity and other properties of both wool and cotton, for instance, are well known to be materially affected both by the temperature at which they are dried and the length of exposure to a drying and oxidizing atmosphere.

In the case of cotton in its natural state as it comes from the bale, it has been observed that mere exposure to the air for some months materially affects the hygroscopic capacity of the mass. This is in part no doubt due to the presence of extraneous materials, such as "leaf" from the cotton plant, but also probably to the gradual hardening of the waterproof coating of waxlike material with which the cotton fiber is covered; and which, though itself non-nitrogenous and non-hygroscopic, ap-

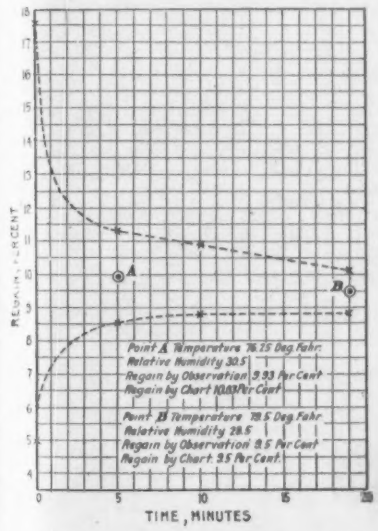
REGAIN, PERCENT
TIME, MINUTES
Point A Temperature 76.25 Deg Fahr.
Relative Humidity 30.5
Regain by Observation 9.93 Per Cent
Regain by Chart 10.03 Per Cent
Point B Temperature 78.5 Deg Fahr.
Relative Humidity 28.5
Regain by Observation 8.5 Per Cent
Regain by Chart 9.5 Per Cent

FIG. 2. LAGGING EFFECT IN SKEIN TAKING UP OR PARTING WITH MOISTURE

pears to be incorporated with or to cover another coating both nitrogenous and more hygroscopic than cotton itself.

The processes of mill preparation, especially combing, eliminate any appreciable effect of "leaf" upon moisture capacity, but the "pectose" matters, as the coverings are sometimes termed, remain with varying capacities for change until removed in the process of boiling off for dyeing, bleaching or mercerizing. Each of these processes has its own important effect upon hygroscopic capacity of the manufactured product which need not be considered here.

In the case of wool as it comes from the sheep's back, there is also a natural and very complex coating. Part of this, the true wool grease, resembles in some respects the waxlike part of the cotton coating, but in its undecomposed state is a complex fatty acid compound with various bases, known chemically as chlorestin and its isoforms, forming fatlike bodies of various melting points whose function on the sheep is to keep the individual wool fibers lubricated. These fatlike bodies, or "esters" as they are sometimes called, differ from mutton fat or beef fat in not having glycerine as a base and being much more difficult to saponify with either caustic soda or caustic potash into true soluble soaps. Nevertheless they readily emulsify with soaps and alkalis and may be thus removed, as in the ordinary soap-scouring method of wool washing. Another distinct portion, left on the wool when the true grease is removed by petroleum ether or naphtha, is also a complex compound of fatty acids (similar to those found in the grease) with almost pure potash, forming natural soaps of excellent detergent properties and being sufficient in amount in most wools to fully cleanse them without the use of any other soap after the grease proper has been separately removed. This "sweaty" matter is very hygroscopic—much more so than the wool itself; and may be the occasion of material differences in judgment as to the probable shrinkage of a given lot of wool examined under different circumstances.

With materials as valuable as silk, wool and cotton and such of their products as are sold by weight, the actual weighing of the water they may happen to contain at the time of sale is of evident importance to both buyer and seller when it is once understood what slight changes of circumstances can cause a loss or gain in weight involving thousands of dollars in many everyday transactions.

The standard condition upon which worsted yarn and tops combed without oil have long been bought and sold in England and on the Continent allows 18¼ per cent. regain or added weight to the standard dry weight condition. The standard for silk is 11 per cent and for cotton is 8½ per cent. Until recently no standards except for silk, which is the same the world over, had been generally recognized in the United States.

Theoretically, it makes no difference whether the standard condition of regain be assumed at one figure or another provided that the actual condition is known and that some standard has been agreed upon between buyer and seller. Practically, however, it is desirable that the standard condition be somewhere near the average expected for the country in which the transaction takes place, and that at the time of delivery the material shall in its whole mass be as near as may be in this standard condition.

DETERMINATION OF RELATIONS

The determination of the exact relation between the three factors, humidity, temperature and regain, was a problem which the author had under investigation for some time prior to 1905. That the absorption of moisture by worsted yarn was in some manner dependent upon relative humidity and temperature was abundantly shown by the year of exterior observations had been recorded in 1895 and 1896, and also by many interior records made subsequently. It seemed possibly true that the atmospheric pressure affected the result, but its effect was so far overshadowed by the element of temperature that, for practical mill purposes, it was evident that the height of the barometer could be neglected. In fact, all observations for either relative humidity or skein regain were made on the assumption of 30-in. barometric pressure.

For the purpose of eliminating the effect of hard twist in retarding the absorption of moisture and the effect of oil upon the net result,[1] a quantity of 2-24 soft twist, French spun, fine Australian yarn was prepared and extracted with ether, dried, and extracted again with warm water to which a few drops of ammonia had been added. After allowing it to hang up for some time to come to its natural state, this yarn was made up into groups of skeins of equal lengths and approximately equal weights. The final weight and moisture state of the groups was carefully determined after they had been hung up together again for about two days, by drying out individual skeins of the different groups in the ordinary ventilated Bradford oven at a temperature of from 220 to 230 deg. Fahr. until they ceased to lose weight, and also by leaving small two-gram skeins in weighing bottles under a desiccator containing strong sulphuric acid.

These two methods were used to check each other from time to time during the experiments, to establish the true weight of the skeins being used as moisture indicators.

[1] Experiments made under the writer's directions proved that olive oil has no appreciable effect in preventing, though it may retard somewhat, the absorption of moisture, but the amount absorbed was strictly in proportion to the dry weight of the wool, and not to the weight of the wool and oil together, though for most purposes the percentage of oil, being small, need not be considered.

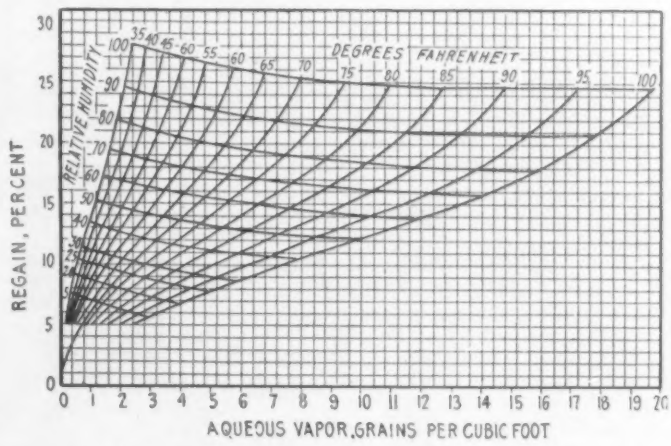

FIG. 3. ISOTHERMAL AND RELATIVE-HUMIDITY LINES FOR WORSTED

Attention has frequently been called to what has been termed the "lagging effect," due to the time required by a skein of yarn to take up or part with moisture. The effect of this is to show for a given humidity and given temperature a higher result when the skein regain condition has been a falling one, and a lower result when that condition has been a rising one. In undertaking, therefore, a careful series of experiments, it was deemed necessary to make the skeins to be examined of such a size that they could be accurately weighed on a delicate balance, and not be so large that the amount of moisture which might be absorbed or parted with by a given skein would require a great many cubic feet of air to supply or displace it.

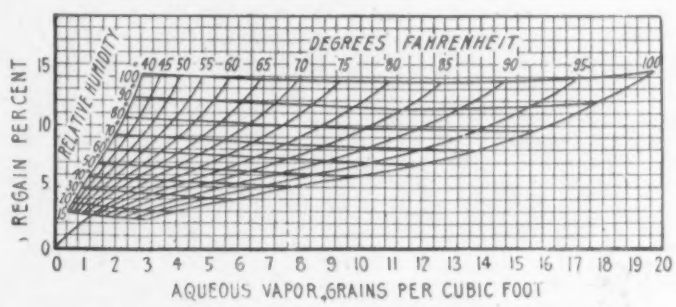

FIG. 4. ISOTHERMAL AND RELATIVE-HUMIDITY LINES FOR COTTON

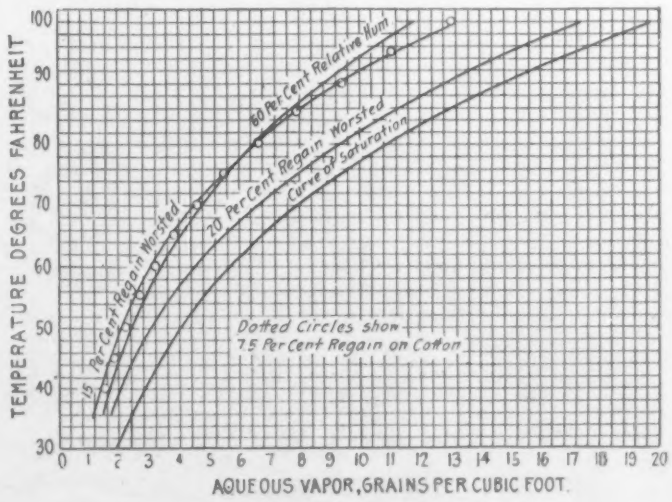
TEMPERATURE DEGREES FAHRENHEIT
60 Per Cent Relative Humidity
20 Per Cent Regain Worsted
15 Per Cent Regain Worsted
Curve of Saturation
Dotted Circles show 7.5 Per Cent Regain on Cotton
AQUEOUS VAPOR, GRAINS PER CUBIC FOOT

FIG. 5. REGAIN OF COTTON AND WORSTED

Upon comparing the results obtained from two skeins hung together, one of which had been previously exposed to a damp atmosphere and the other to a

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comparatively dry atmosphere, it was soon found that while it might require hours or even days to bring the skeins exactly together again, the mean between the two at any time after fifteen or twenty minutes was practically the same in repeated experiments for the same temperature and relative humidity, and presumptively equal to what a third skein would have shown which had been a long time exposed to identical conditions. It was therefore assumed that this method could be relied upon to quickly determine the true regain relationship for any not too rapidly changing conditions. It was thus possible to make use of the very lag effect, which had previously rendered individual observations seemingly incompatible, to establish comparatively accurate and true results. Figs. 1 and 2 are intended to illustrate this lagging-behind and coming-together effect and the method of obtaining quick results.

In order to compare the results obtained by this method, a special form of charting[2] was devised, shown in Fig. 3 for worsted and Fig. 4 for cotton, on a scale greatly reduced from the original, where the ordinates represent regain and the abscissæ moisture per cubic foot of space for the temperatures and relative humidities found and shown in the figures. It will be observed that the lines joining points of the same relative humidity (for example, the 50 per cent. line) cross the isothermal lines in a generally oblique direction, curved slightly convex on the downward side; that is to say, for a given relative humidity the regain is less at the higher temperature, but not less in a constant ratio.

By the aid of this charting principle a sufficient number of points were located to trace the isothermal and the relative-humidity lines shown, and from these charted results it was found possible to tabulate by interpolation the percentage regain on worsted with a fair degree of accuracy for each percentage of relative humidity from 15 per cent. up to near saturation, and for isothermals 5 deg. of temperature apart from 35 deg. Fahr. to 100 deg. Fahr.

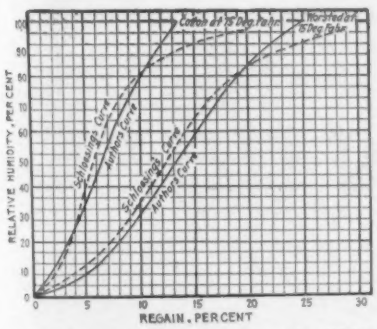

FIG. 6. COMPARISON OF AUTHOR'S (1915) AND SCHLOESING'S CURVES

The data for securing the cotton chart were not by any means so complete as those used for the worsted chart, and therefore the same degree of accuracy was not expected for it.

It will be seen from Figs. 3 and 4 that the regains for cotton are approximately one-half those for worsted under like conditions, but the relative-humidity lines are more nearly straight and therefore bear a more nearly constant ratio to the regains.

Another method of comparing results is shown in Fig. 5, in which curves of saturation (100 per cent. humidity), 60 per cent. relative humidity, 15 per cent. regain in worsted, and (to avoid confusion) a number of points only on the curve of 7½ per cent. regain in cotton, are represented. An additional regain curve for 20 per cent. on worsted is also shown.

It will be noticed that at ordinary mill temperatures the 7½ per cent. curve for the cotton here used closely coincides with the 15 per cent. worsted curve, and within the limits of observation their deviation is not great at either high or low temperatures. In the absence of other considerations, this fact might be taken therefore as reason sufficient for establishing a 7½ per cent. regain for cotton for this country, if it be conceded that 15 per cent. is the proper standard for worsted.

The author, in his paper of 1905, called attention to a paper by J. H. Lester citing in turn a paper by Schloesing containing tables of the hygroscopic property of several fibers, and gave a diagram showing the relation of cotton, silk and wool for three temperatures—10, 24 and 35 deg. Cent., by curves whose ordinates are relative-humidity percentages and abscissæ regain percentages. Fig. 6 shows a comparison of his curves for cotton and worsted at 24 deg. Cent. (75 deg. Fahr.) with those obtained from the author's data by the same method of charting.

One of Schloesing's methods of investigation involved the use of pure sulphuric acid of known strengths in obtaining known and comparatively constant states of relative humidity in a closed vessel or chamber.

Both of his methods, though checking up well with each other, involved the question of control and length of time required to arrive at results—a time so great that to apply them over a wide range of temperatures to make a complete comparison with the writer's figures seemed out of the question. The sulphuric-acid method was the simplest but, though making use of conditions of known humidity in obtaining the facts (not the law) of regain, neglected the phenomenon of lag—one of the time elements in the problem.

ELIMINATING LAGGING EFFECT

These observations, however, were not accurate enough to correlate results with mathematical precision for different temperatures, particularly at the higher humidities. To accomplish this, it was necessary to obtain the elimination of the lagging effect by direct observations under conditions of constant temperature and constant humidity indefinitely maintained, or so closely known that the constant condition required could be calculated. In attempting this, use was made of Schloesing's sulphuric-acid method in an apparatus developed after much experimenting, shown in Fig. 7, so that observations could be repeated over and over again under conditions calculably alike upon the same and upon different pairs of skeins to obtain a satisfactory average for a given kind of material at as many points of temperature and humidity as desired.

The principle of operation of the apparatus is: A pair of skeins, one moister and the other drier than the proposed humidity would give, are hung on the two ends of a specially designed metal frame within an enclosed metallic vessel, the cover of which is sealed by mercury.

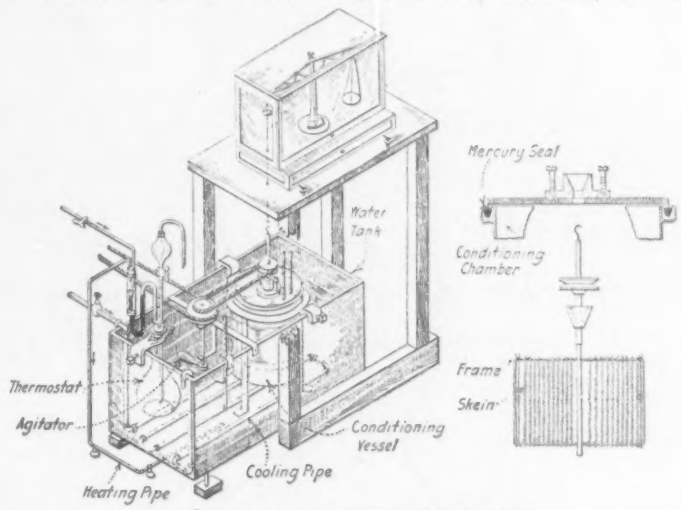

FIG. 7. APPARATUS FOR DETERMINING REGAIN

It will be noted that: *The original dry weights of the skeins having by calculation from blank tests on other skeins been made equal, one-half of the sum of the weights found always represents the average present condition of the two skeins.*

It was soon found that in about an hour's time an equilibrium was established between the two skeins so that there was neither gain nor loss thereafter, while the temperature remained the same.

It was, however, found on repeating the same experiment on the same pair of skeins, in the same order, that is, the same skein always remaining the drier, that the successive observations gave continually lower results for the average regain; but if the skeins for a repeated experiment were alternated in the exposing condition, that is, if the one which had been drier in the first instance was made the damper in the second, then the results represented a very nearly constant condition of regain, not only for the same pair of skeins but for duplicate pairs, and in the final accepted results a series of tests on duplicate samples alternating for the moist and dry state in each were averaged for each point of regain determined.

By suitable humidities and temperatures thus predetermined and accurately controlled, points of regain in sufficient number were found not only to confirm the basis for the general law previously propounded in 1905, but to extend its application so as to cover for both worsted and cotton the relationship of humidity and regain at all temperatures within the limits of the apparatus as arranged, giving reliable results not previously found possible.

A comparison between Schloesing's curves on cotton and worsted at 24 deg. with the author's new curves at 75 deg., using relative humidity for one co-ordinate and regain for the other, as was used in his method of charting, shows the present relationship of these curves as much nearer than exhibited in the first paper. Under the present understanding of the subject, however, the author believes that Schloesing's figures are too high above 90 per cent humidity, particularly so on cotton. (See Fig. 8.)

To summarize these laws of regain in cotton and worsted, we can say:

First. The general law for cotton and worsted, and probably for any other textile fiber, may be expressed by the formula

$$KRT^a = H \times 5771.44 \times 10^a \ldots [7]$$

in which H represents any given relative humidity expressed decimally; R the regain at any absolute temperature T; K is a variable coefficient depending upon H, R and T in such a way that for $H = 1$, or saturation, the product KRT^a is a constant quantity represented by the number 5771.44 $\times 10^a$. In this, 5771.44 is the weight in grains of a cubic foot of aqueous vapor at any temperature multiplied by the corresponding absolute temperature in degrees Fahrenheit, divided by the maximum elastic force of aqueous vapor at that temperature expressed in inches of mercury. In this expression, therefore, we are independent of tables for saturated aqueous vapor, either for unit of weight or elastic force.

Second. For any given temperature the relation of values of R to the variable K, for both worsted and cotton, is expressed by a hyperbolic equation, differing for each substance.

Third. For any other temperatures the law for worsted is: *For the same humidity the squares of the regains at different temperatures are to each other inversely as the cubes of the corresponding absolute temperatures.*

Fourth. The law for cotton is: *For the same humidity the first powers of the regains at different temperatures are to each other inversely as the first powers of the corresponding absolute temperatures.*

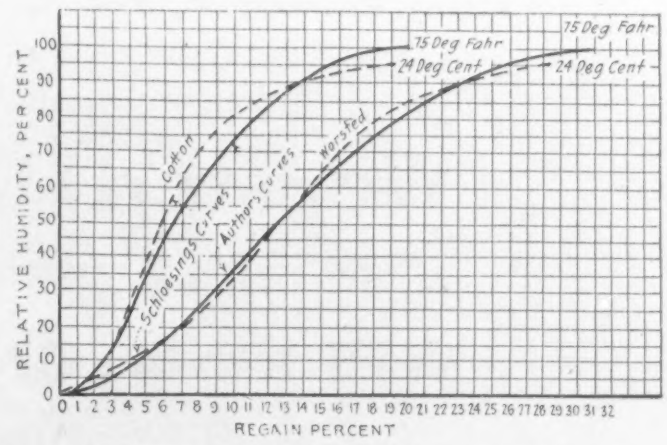

FIG. 8. COMPARISON OF AUTHOR'S (1911) AND SCHLOESING'S CURVES

[2] For this form of charting the author is indebted to Mr. Richard P. Iddings, chemist at the Arlington Mills, who not only made the observations required in its construction but conducted a large part of those utilized in succeeding papers.

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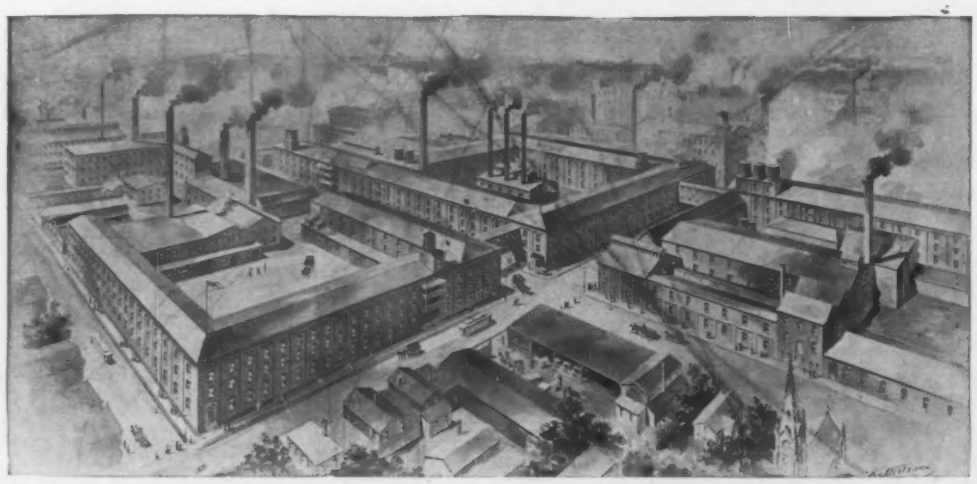

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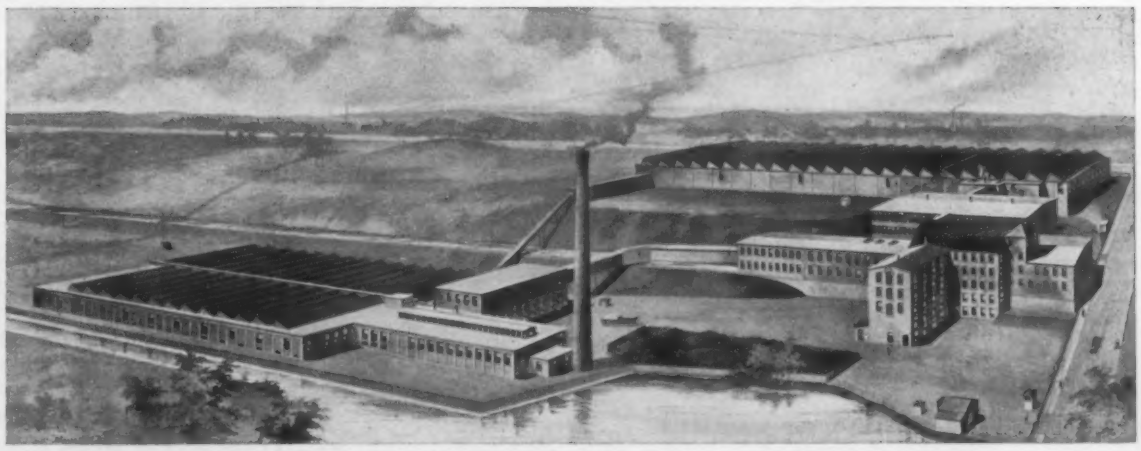

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Government Buying and Demand for Hand Knitting Yarns Dominating Features

UNPRECEDENTED advances in prices proved to be the leading feature of the worsted yarn market for 1917. Many influences were continually working to this end, which as the year closed brought worsted yarns up to levels far beyond the conception of the average factor in the trade. The limited wool supplies available in this country during the year, which were supplemented only by South American wools, were naturally a continuous stimulating influence. Large orders for various Government fabrics, which engaged a large percentage of the machinery, and forced civilian lines into a secondary position, contributed largely to the upward movement of the market. However, the record-breaking business done in knitting yarns, particularly hand-knitting yarns, eventually proved to be the dominating factor in the trade, and practically fixed prices for the other branches of the industry because of the high figures paid as premiums for these yarns.

The close of 1916 found prices increasing steadily without any prospect of restraining influences. They had already reached levels which checked any tendency to general active buying in anticipation of requirements, because of the uncertainties surrounding the goods market on high-priced fabrics. However, the market was in the control of the spinners, and continued to be so as the year progressed. Constant predictions were heard of still further advances in prices, which did not tend to relieve the situation for yarn users. There was a general disposition to operate cautiously and to buy yarns only as the situation demanded. The opening of 1917 found quotations for the popular yarns within the following average range: 2-32s quarter-blood, $1.30 to $1.32½; 2-36s three-eighths at $1.40 to 1.42½; 2-40s half-blood at $1.65 to $1.85; 2-50s at $1.80 to $1.95. Such high prices proved to be a difficult matter for many manufacturers to comprehend, or rather to determine how they could operate upon such an unusual basis, so that business was necessarily restricted.

This extreme position of yarn values was based entirely upon wool costs, and the continued advance of wool prices throughout the year was therefore always forcing spinners upward. By the time the new domestic clip reached the market, quotations were based upon still higher levels so that further advances were necessitated in order to cover these increased costs. As these wools were the only source of supply in addition to South American wools, which were also bought at high prices, there was little chance for relief. As the demand for wools developed through the year with the placing of large Government orders, the chances for selection became proportionately smaller, and consequently still higher prices prevailed. This situation proved to be the strongest kind of a stimulant to yarn prices, and gave no opportunity for spinners to revise their quotations except upward.

CIVILIAN TRADE SECONDARY

As previously stated civilian business during the year has occupied a secondary position in the eyes of the trade. There was at no time any general development of activity, and buying was, as a rule, of a decidedly scattered character. Manufacturers found they would be compelled to offer a high-priced line which would be difficult to sell, and hence this end of the trade was generally unsatisfactory. About the only trade which seemed to enjoy any activity worth mentioning were those mills producing staple lines with an established trade. Lines of fancies were generally limited because of the expense involved in making up an extensive line of samples. There was also quite a little attention given to working out combination goods of worsted with woolen yarns, or cotton and woolen, in the hope of securing a fabric which could be put on the market at a popular price. As the goods market opened the early developments showed an extensive business on moderate-priced fabrics, and those coming in later were forced to the higher lines because the others had been largely withdrawn. However, at no time was this business considered satisfactory, nor was there much opportunity to develop any continued activity. With the entrance of this country into the war, reports came from all sides of poor business in ready-made clothing because of the anticipated call for active service which would make purchases of civilian wearing apparel unnecessary. This was only one of the factors tending to produce in this end of the industry desultory trading, with spasmodic bursts of interest. In many instances also interest in yarns for civilian purposes was satisfied by stock lots which could usually be picked up below the average quotation for yarns to be made. While these yarns were usually in very small supply, occasional offerings would make their appearance, and thus tend to prevent spinners from attaining their top asking prices. Most of these stock lots of yarn offered for resale were due to Government contracts which required the use of other counts or grades, and left these yarns on hand without any definite use. As they were usually taken in on contracts at a price lower than the prevailing market, the manufacturer was glad to realize a profit by reselling them below average quotations.

CONDITIONS AFFECTING PIECE GOODS MILLS

This unsatisfactory condition prevailed during the year, so that at no time was the civilian trade able to develop any general activity which could be maintained. As the close of the year drew near, manufacturers were apprehensive of their ability to offer any lines of goods at prices which would secure a large volume of business. Both men's wear and dress goods mills were affected by these conditions so that there was little chance to feel gratified by the showing made. With the prospects of still further Government business of an extensive character, the ability of this trade to secure sufficient wools and yarns, at any price whatsoever is considered doubtful. It would seem as if they would be compelled to accept what little stocks may remain after Government needs are satisfied, at correspondingly high prices.

MACHINERY ON GOVERNMENT ORDERS

With the severance of diplomatic relations with Germany, the trade generally looked for heavy purchases of goods for army and military purposes by the Government. This expectation was very soon realized, and at once the effects of the large proportion of machinery engaged on these goods, and the purchases of wools to cover these contracts soon produced a powerful influence. Yarn prices stiffened, and manufacturers found the market steadily going against them. One mill which had purchased in October, 1916, 2-32s worsted at $1.12½, and 4½ run or 24s cut woolen at 90c., found in March these yarns priced at $1.37½ and $1.40 respectively, and hence was forced to withdraw this line. This situation was by no means uncommon. The better prices paid for Government goods, as well as the certainty attached to these orders, as well as the patriotic motive behind these orders soon resulted in a large percentage of the machinery engaged on this work. When war was actually declared and preparations were made to equip an enormous army and navy, requirements increased still more. The secrecy surrounding the activities of the army purchases made it extremely difficult for the trade to form any definite conclusion as to the actual extent of the business. The only tangible evidence was the activity of a large number of mills, and the contracts placed with spinners which soon taxed their production to the utmost in an effort to maintain required deliveries, also the withdrawal of certain grades of wools by purchase to cover these orders, resulting in still further advances in wool costs.

ARMY SPECIFICATIONS MODIFIED

The scarcity of the usual grades demanded for Government fabrics soon led to the modification of the specifications, and the general use of medium wools soon brought about an apparent shortage of these grades. With the coming of South American wools, these were used extensively to supplement domestic wools by means of blends, which not only added to the available stocks of wools, but also reduced the average cost. However, yarn prices steadily hardened, although at no time were spinners able to obtain a price on a parity with wool costs. The difficulty in securing the required stock dyeing for Government goods, soon led to efforts to permit the use of skein dyes or piece dyes as the limited facilities for stock dyeing made it impossible to increase this production materially so as to keep pace with the required deliveries of yarns. The continued advances in wool costs developed various efforts to regulate the market by voluntary expedients, but these apparently had little effect, at least so far as protecting civilian users went. The purchase of certain stocks offered the Government in an unknown volume which, however, were not released for manufacturers but held as an emergency merely served to move prices still higher for the remaining stocks, and added to the uncertainty of the situation. The announcement of the Government of the regulation of prices for foreign wool purchases made after Dec. 15 also aroused not a little discussion as to the outcome, which at this writing is still a matter of more or less conjecture.

Toward the close of the year a deadlock developed between the Government and manufacturers over the prices stipulated for the various fabrics. The limit set by the Federal authorities proved unsatisfactory to weavers as the cost of the yarns did not permit them to produce the goods at the price set. For example, the 16-ounce fabric was figured at $2.85, but this would require a yarn costing $2.05, whereas, it was quoted around $2.35. At present this situation continues unchanged, and it is difficult to predict just what will be the final outcome, although it is considered much time has been lost in the production of needed goods. All during the year there were developments of labor troubles with increased costs of operation. A strike in Philadelphia broad loom mills tended to cut down production of Government goods materially; this has resulted in the employment of green help, largely made up of women, as substitutes for the men, which necessarily involves a tedious period of training.

GOVERNMENT KNIT GOODS DEMAND

Demands for Government underwear and hosiery early in the year occupied the attention of French spinners. So great was the volume of business placed that most manufacturers were compelled to withdraw from the market, because they had nothing left to offer. In fact, at one time these mills withdrew from civilian trade entirely for a period of thirty days in order to produce the yarns required for this work. French spun merino yarns were generally withdrawn because of the general use of a straight worsted in combination with cotton yarn. As the year draws to a close the large additional contracts placed for underwear are of such size, and require such a large production of yarn that manufacturers are dubious of their ability to take care of their civilian trade. The bulk of this business was placed on a basis of $2.75 for a single 30s half-blood yarn.

However, what appears to be the dominating feature of the market is the trade on knitting yarns, both for machine-made goods, but more particularly for hand-knitting yarns. When the year opened, manufacturers of sweaters and other knitted goods were operating rather cautiously because of high prices for yarns. For 2-30s quarter-blood in the oil $1.30 to $1.35 was generally quoted. Most of the buying was of a filling-in character. Knitters seemed to be able and willing to pay higher prices than weavers were willing to accept, and as they found the market showing no signs of decline, with the Government a heavy user of quarter-blood stock, they soon began to develop an interest in yarns, with continued efforts to place contracts ahead, which spinners were loath to accept. While the army was not placing any orders for sweaters as a part of the soldier's equipment, the navy did place orders, which caused considerable activity on these goods. Nevertheless the civilian demand for goods, and army contracts for gloves and other knitted goods developed a well-maintained interest in these yarns throughout the year, with consequently advancing prices, because of the depletion of the stocks of medium wools required largely by this trade. So anxious were knitters to secure yarns, they made constant efforts to place contracts ahead in order that they might be able to figure on the coming season, but it was only at the last minute that spinners permitted them to place this business. However, by the end of December contracts were accepted calling for deliveries running up to June, 1918, although care was exercised as to the reliability of the buyer. Prices had reached extreme levels, with a 2-30s quarter-blood sold at around $2.25 and $2.30 in the oil.

However, it was the unprecedented

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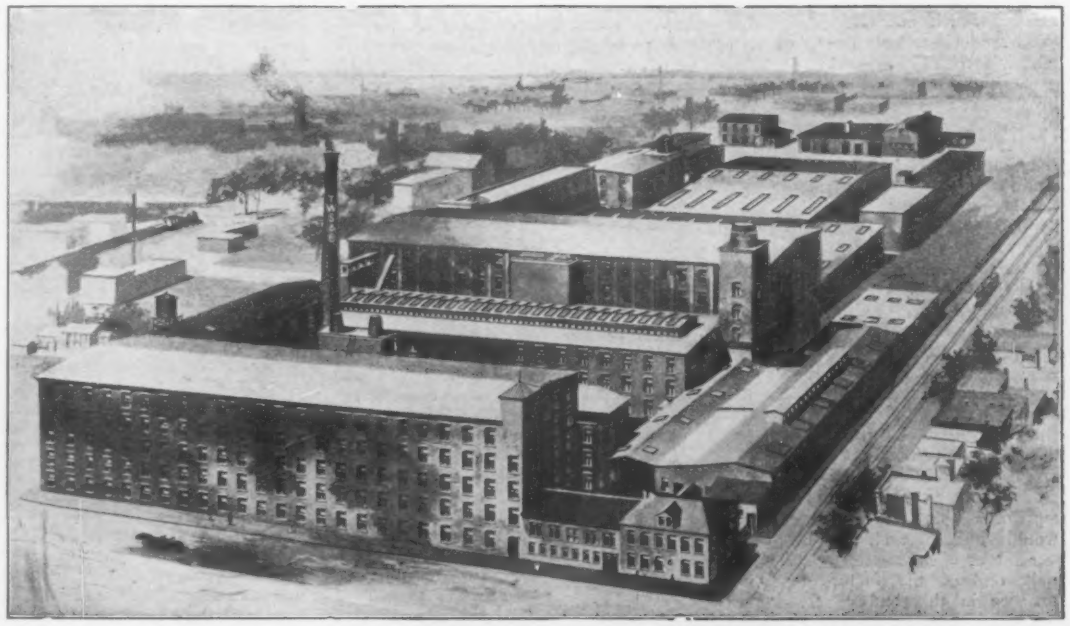

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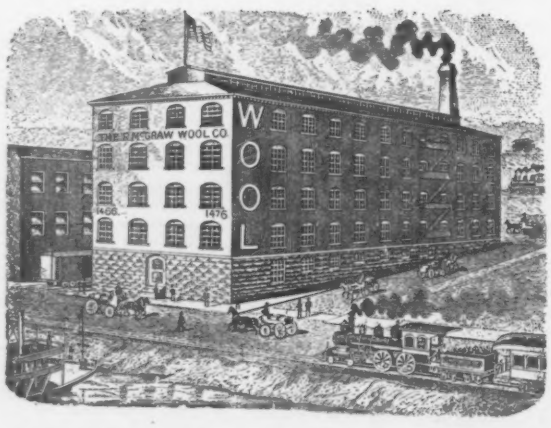

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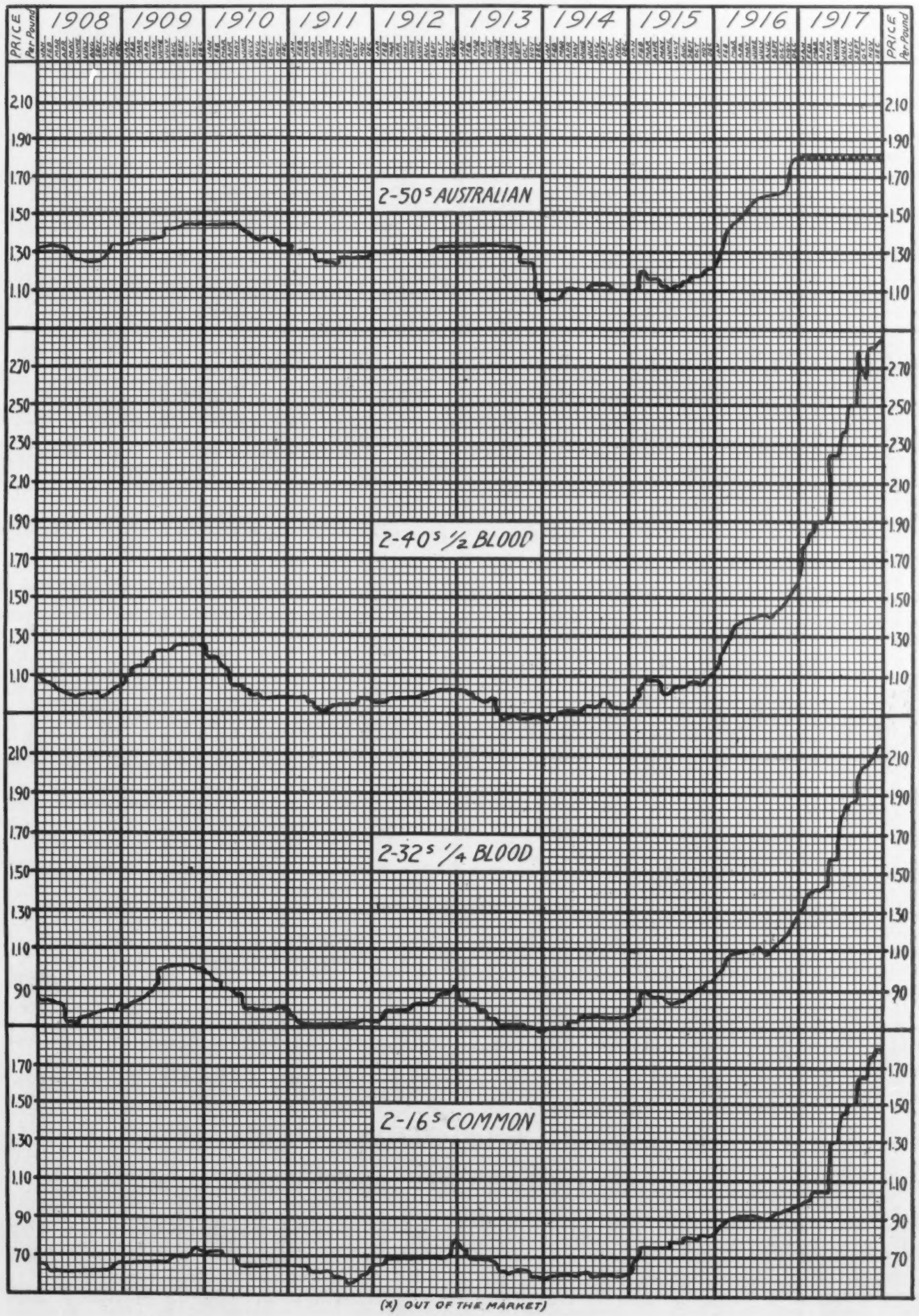
COMPILED BY THE TEXTILE WORLD JOURNAL FROM REPORTS OF ACTUAL SALES MADE IN THE PRINCIPAL SELLING MARKETS



(x) OUT OF THE MARKET)

THOMAS H. BALL

Worsted Yarns

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demand for hand-knitting yarns which finally set the pace for the entire market. Since the Government did not furnish the enlisted men with sweaters, mufflers, etc., the Red Cross the Navy League and other organizations quickly undertook the work of supplying these much-needed garments. Although the spirit shown by women in knitting for soldiers and sailors was most commendable, it has been questioned whether it would not have been best to have had this work done on machines and handled in a more systematic manner, resulting in greater economy and a closer maintenance of prices. Demand for these yarns grew by leaps and bounds to such a degree that many spinners devoted either their entire plant to this product, or at least a portion of their equipment. The entrance of many unfamiliar factors into this market, offering extreme prices for four-ply yarns, soon brought about unheard-of prices. Naturally the profits possible on this business soon led many factors to give a preference to these buyers because of the premiums paid. This resulted in establishing a high basis for other yarns. Where a 4-10s sold in July around $1.70 to $1.72½, by the end of the year, they were selling at $2.40 or thereabouts in the oil, while an oxford mixed or a skein-dyed khaki brought from $2.75 to $3.00.

Spinners found that where a weaver had a limit of $2.00 for a 2-24s in the oil, a knit goods manufacturer would pay $2.25, while for hand-knitting yarn in four-ply, a premium of from 10 to 15c. was possible. Naturally spinners usually calculated their prices on what they could realize for a hand-knitting yarn, making a slight allowance for the twisting. The same condition applied to woolen spinners, and by the end of the year there was a very limited amount of these yarns offered for machine purposes. Here spinners found it more attractive to sell a hand-knitting yarn at $1.85 in the oil, or $2.25 dyed, than to sell to a manufacturer the yarn in the oil around $1.50. As a result the worsted yarn market has been generally dominated by this trade, which has reached dimensions undreamed of, and so far showing no signs of abating. For that reason the future is fraught with many uncertainties, although it is confidently expected that prices will not be any lower. Nevertheless there is a concerted effort to hold prices to levels now established, and to prevent further advances. How well this effort will succeed the future only can show.

High Prices Feature Silks' Year

Advances Rapid with Declines Quickly Following Until Checked by Pegged Levels

A REVIEW of the year in silks is really a review of prices, for outside of the constant variation in values there were no important features to the market. At no time during the year was there any real volume to demand, for uncertainties were many and varied, with a resultant close to requirement buying on the part of manufacturers. How silks would be treated on the essential list by the National Administration was never clearly known even to the end of the year; war disrupted the Italian silk source and for a time discouraged imports from Japan; threatened import taxes accentuated the uncertainty of values; and the national wave of economy that followed this country's entrance in the war, for a time checked trading. Despite the lack of big business there was a constant upward trend to values, and while fluctuations occurred almost weekly, each decline was followed by a rise to a new high level, resulting in mid-August in the highest prices ever experienced, but in the course of another week values began to recede and decline followed decline in rapid sequence until minimum prices were established in Yokohama.

GREAT UNCERTAINTY ABROAD

This country's declaration of war on Germany came at a time when the market was in a rather non-committal state, and its real effect was more of an indirect than a direct nature. It did serve, however, further to restrict trading here and to disrupt conditions in Japan. So uncertain was the situation abroad that the Yokahama exchange closed, but as the latter is generally composed of speculative interests no concern was felt in the market. So small was demanded in this country that prices began to recede and within the course of a week such recessions amounted to fully 15c. a pound on all qualities. From this time on to the end of the year buying remained of only nominal proportions, with manufacturers taking stock in a volume sufficient only to cover positive or nearby apparent needs.

Stocks of silk on hand, however, were of small volume and with importers failing to push for business after the initial recessions there was no further important sacrifice to values. Shipping was soon disorganized, and for a while it was practically impossible for imports to obtain ocean tonnage. British merchant ships were out of reach, and American vessels were unobtainable for there was practically none. A little later Japanese ships were withdrawn from the Atlantic seaboard, and confined to Pacific Coast ports. The latter, combined with increased shipping rates, advanced importing costs fully 2 to 2½c. a pound.

At no time during the year was there a heavy surplus of stock on hand in this country; in fact, almost the complete opposite was true. Imports from Japan were so restricted that it was only with a considerable difficulty that silk of such origin could be brought in. Italy was practically eliminated as a source of supply, for war conditions in that country placed silks at a level almost completely out of reach. In fact, in midsummer a majority of importers withdrew quotations; such action was necessitated by the fact that grades quoted within a range of $7.30 to $7.75 were actually selling around $9 a pound. China's many vagaries largely eliminated that source of supply, for prices there were comparatively higher than in any other primary market.

EXTREME PRICES REALIZED

As previously mentioned, all the year's features are included in the fluctuation of prices. During the first several weeks, or until the middle of February, there was no little uncertainty to levels, and the passing of each week witnessed new quotations. Declines and recoveries followed in rapid succession, yet in almost every instance declines were succeeded by advances to new high levels. Most of the fluctuating took place in those weeks of the year that preceded the breaking of our diplomatic relations with Germany. For the few weeks immediately following the latter development price changes remained about as inactive as trading. When it became evident that the declaration of war could have no extreme depressing effect on business, but would curtail imports, prices began a steady upward climb. In one week early in August advances were extreme; prices in that short period appreciated from 40 to 65c. a pound, according to quality, with the finer grades showing the sharpest advances. Late in November price advances culminated in the highest levels ever experienced, but soon after began to recede, and declines from then on were almost as rapid in succession as were the previous advances. Added to the seriousness of the situation were the attempts of the speculative element to get under cover, but little opportunity was afforded and some heavy losses are known to have been taken.

The declining tendency of values was finally checked, but only after the severest procedure, which included the establishment of a minimum level in the Yokohama market, that to the end of the year was firmly adhered to. Not only did Japanese interests peg values, but daily working hours in silk filatures were reduced, and finally more drastic steps were taken in an extended shut-down of such plants. The first action was the reducing of daily hours of employment from 14 to 11, and the larger shut-down extended over an additional two weeks; soft reelers closing Dec. 20 and hard reelers Dec. 25, both to remain closed until Jan. 25 of the new year. Despite this action there was no material depletion of the surplus of stock in Yokohama, which, at the close of the year approximated 30,000 bales. Trading, however, assumed a slightly broken attitude, and it was confidently expected that when reelers reopened there heavy surplus would have been dissipated.

IMPORT DUTY ANTICIPATED

In April the attitude of Congress gave strong evidence that a substantial import duty would be placed on raw silk, and for a time this influenced an increase in demand and naturally aided the upward trend of values. Importers for a while were at a loss to know what to do, but a little later the difficulty was at least partially solved by the incorporation in contracts of clauses placing the burden of any tax on buyers. The problem, however, reached a happy conclusion for both importer and buyer when the Administration failed to levy any tax on goods formely on the free list.

The course of prices during the year is best illustrated in a comparison of values on Japanese silks at the three critical periods of the year: Jan. 2, to show the starting levels; Aug. 18, to show the high figures touched; Nov. 17, to show the points declined to when prices were pegged in Yokohama. From the latter date to the last day of the year there was no change in quotations.

JAPAN FILATURES

Kansai Double Extra	Jan. 2.	Aug. 18.	Nov. 17.
Crack	5.95	7.60	6.00
Kansai Extra 13/15	5.42½	7.45	5.75
Best No. 1 Extra 13/15	5.32½	7.40	5.67½
Best No. 1	5.27½	7.32½	5.60
Kansai No. 1, 13/15	5.20	7.22½	5.55
Shinshu No. 1, 13/15	5.15	7.10	5.50

6 months basis.

Worsted Yarn Prices Reviewed

A Survey of the Market by Thos. H. Ball of Philadelphia

AT the close of 1916, owing to the war demands of the Allies, wool values rapidly advanced, and mills with any supplies of wool made up their profits of 1916 largely by the advanced value of their stock. The more rigid tightening of wool imports led to rapid advances here, beginning January, 1917, and for an extended period throughout the year, wool values advanced in greater proportion than obtainable in corresponding prices of yarns and goods, owing largely to the earlier purchased stock of yarn and earlier goods contracts. Prices of yarns and goods were further held in check by the many offerings of stock yarns in the hand of spinners and weavers. The stock yarn feature was further intensified by the declaration of war in the spring when manufacturers and spinners offered their resources of manufacture to the Government. The actual contracts and prospects of Government work led to considerable offerings of yarns owned and on contract for civilian goods. The advanced market prices afforded liberal margin of profit figured at much less than prices based on current wools, thus checking more rapid commensurate prices of yarns at this time.

In reviewing the ruling prices of worsted yarns in 1917, it is of interest to note the close of 1916 found prices ruling for weaving yarns in December:

2-32s, ¼ blood	$1.20—$1.25
2-36s, ⅜ blood	1.30
2-40s, ½ blood	1.72½-1.75
2-50s high, ⅝ blood	1.85

By January, 1917, prices started a further advance, and by March they were for

2-32s, ¼ blood	$1.30
2-36s, ⅜ blood	1.45
2-40s, ½ blood	1.90
2-50s high, ⅝ blood	2.10

Prices continued to advance in harmony with wool advances, and increased costs of production, showing in May

2-32s, ¼ blood	$1.40
2-36s, ⅜ blood	1.65
2-40s, ½ blood	2.00
2-50s high, ⅝ blood	2.25

From this period prices started to advance more rapidly, and in July were as follows:

2-32s, ¼ blood	$1.50
2-36s, ⅜ blood	1.75
2-40s, ½ blood	2.40
2-50s high, ⅝ blood	2.65

At this time the increased wages and increased cost of all supplies, scarcity of help (cutting down the normal productions of mills), added materially to cost, and with climbing wool costs, prices of yarns in September advanced as follows:

2-32s, ¼ blood, to	$1.85
2-36s, ⅜ blood, to	2.25
2-40s, ½ blood, to	2.90
2-50s high, ⅝ blood, to	2.95—$3.00

and with the same conditions of ever increased costs of production, and wool costs, prices advanced further, showing in December, 1917:

2-32s, ¼ blood	$2.25—$2.30
2-36s, ⅜ blood	2.55
2-40s, ½ blood	3.00
2-50s high, ⅝ blood	3.15

Knitting yarns showed the same relative prices with the exception of higher relative prices for yarns and grades not in competition with stock yarns; 2-30s, ¼ knitting yarns, advanced from $1.30 December, 1916, to $2.30 December, 1917; 2-30s, ⅜s, from $1.37½ in December, 1916, to $2.40 December, 1917; 2-18s, ½s, from $1.50 in December, 1916, to $2.80 December, 1917.

Shortly after the declaration of war, the sweater demand started great demand for hand-knitting sweater yarns, and spinners with facilities for making these yarns engaged in this production to their full capacity, naturally resulting in greater demand for ¼ blood wools.

During a large part of 1917 yarns for civilian goods showed a gradual falling

(*Continued on page* 321)

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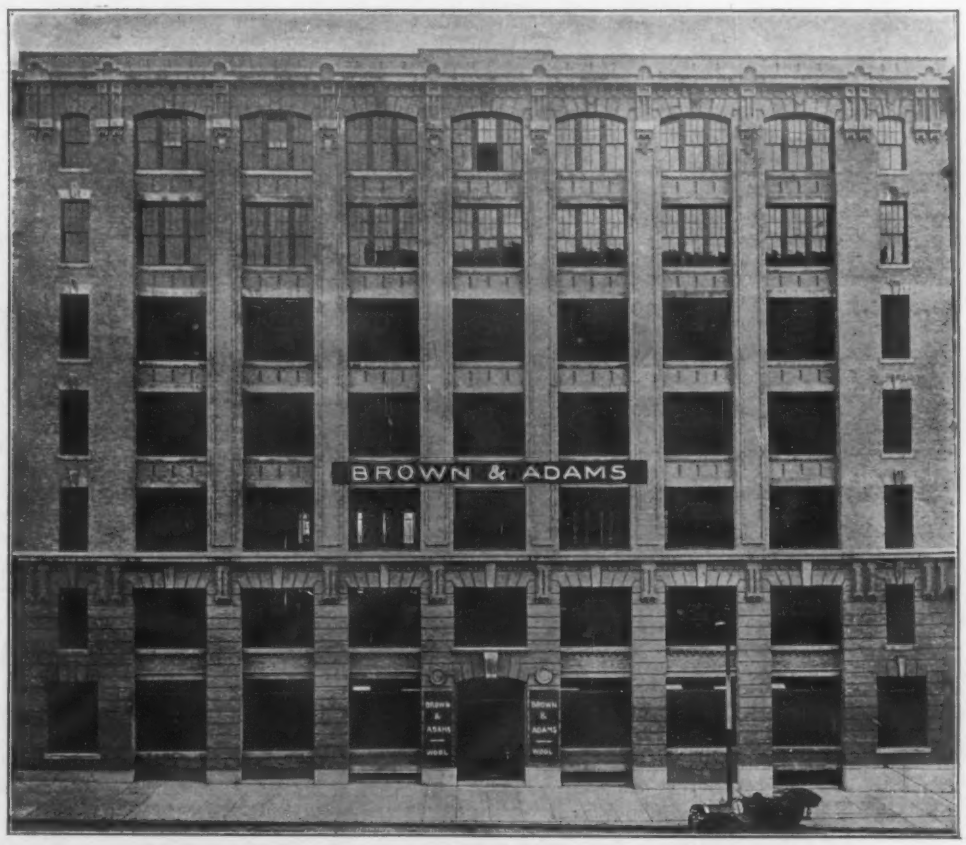

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ANOTHER year of broken precedents, perplexing problems and great financial risks has passed, and the wool trade is still on the crest of the wave of prosperity. New and more successful methods have followed the breaking of many of the precedents which seemingly were strongly entrenched in trade practice. Difficult problems that the succeeding days brought in bewildering array have been met and solved in a way to reflect credit on the rank and file, as well as upon the leaders to whose initiative safe and sane action was due. Heavy expenses and staggering financial risks have brought correspondingly large returns. Altogether 1917 must be written down as one of the most successful, if not the most satisfactory, in the history of the trade. Whether viewed from the standpoint of its unprecedented offers of stocks to the Government at fair prices, its tremendous volume of subscriptions to the Liberty Bond issues, or the number of men who have actually gone from the trade into the country's service, the wool trade holds its proud preeminence among the leading commercial bodies of the nation. While the younger men are risking their lives, those too old for such service are giving time and energy freely and generously to a service no less important. The record is a proud one, and its glory can not be dimmed, no matter what the future has in store.

GOVERNMENT STOPS HOARDING

As the wool merchant reviews his experiences for the year 1917, two things must stand out with startling distinctness: The entrance of the United States Government into the wool markets of the world as an active buying factor; and the shifting sources of the foreign wool that has been of necessity imported for the use of American mills. It is true that there have been other salient features during this period, for it has been another year of broken precedents and new experiences, but the above have naturally attracted wide attention, and promise to be even more prolific of trade surprises in the future.

Perhaps the first of these features may be considered the more important, as it was developed shortly after the entrance of the United States into the World War, and already under its influence new precedents have been established that threaten to revolutionize wool buying and selling, at least for the duration of the war. Singularly enough, the first practical suggestion that the Government buy its wool direct came from the Boston wool trade, under whose lead the available supply of wool in the country was offered to the Government on the basis of values prevailing April 2, thus establishing a new precedent for patriotic business action.

Under the operation of this offer, there was presented the unusual spectacle of a great trade voluntarily establishing an embargo upon all buying and selling for the time being, and pledging its members to turn over to the Government its entire holdings, whether actually in stock, in transit, or bought and not yet shipped. It was claimed, and undoubtedly without possibility of contradiction, that nothing like it had ever been seen in this or any other country. That the Government was not yet ready to operate in this way, and therefore was obliged to decline the offer, in no way detracts from its merit.

For ten days in the early part of April wool trading in the Boston market was absolutely at a standstill, as far as new business was concerned, the loyalty shown by the different wool houses in carrying out the terms of the agreement being the cause of much favorable comment. This offer was renewed later, but in a modified form, the volume of the offerings being restricted to 50 per cent. of available stocks, the price basis suggested being that current on July 30. Between April 1 and August 1 there was a big advance in wool values in the Boston market the most desirable grades and classes showing gains of 15 to 25 cents a pound. Thus it will be seen that even though full asking quotations were not paid when purchases were finally made, failure to act favorably on the first offer cost the Government a tidy penny.

WOOL TRADE TAKES CENSUS

One interesting development of the first offer was the wool census of Boston, taken in connection therewith, the first time that such a stocktaking has been done other than at the beginning of the year. This census, which was much more elaborate than anything before attempted, separated the stocks into greasy combing and combing pulled, greasy clothing and clothing pulled, and scoured or carbonized, and gave the estimated yield of each class. According to this there were in stock in Boston wool warehouses, April 3, 14,545,535 pounds domestic wool, with a total estimated yield of 9,247,898 pounds, and 740,000 pounds greasy domestic wool, not classified, and on which no estimate of yield was made. Stocks of foreign wool, actually on the spot, were 47,549,104 pounds, with an estimated yield of 31,463,539 pounds, making the grand total, 62,934,639 pounds. This compares with a total of 44,099,484 pounds on Jan. 1, 1917, of which 25,412,380 pounds were domestic wool and 18,687,104 pounds were foreign.

Incidentally it was developed that the various Boston houses owned 28,859,202 pounds of foreign wool, due to arrive at some unknown or unspecified date. As this was the first time that this item had been included in a Boston wool census, there was no opportunity to make comparisons, though it seemed to be the general opinion in the trade that while the supply of foreign wool, actual and contingent, was larger than usual, it was not burdensome, in view of the war conditions existing; this in spite of the fact that spot stocks were larger than shown by any previous census taken under the direction of the Boston Wool Trade Association.

Following the rejection by the Government of the wool trade's offer, there was so much speculation, and the advance in values was so sharp, that the leaders in the trade felt that something ought to be done to curb the upward trend of values and to prevent the development of a runaway market. Action in this direction was precipitated, or at least stimulated, by the action of the Navy Department, announced in July, in purchasing a supply of wool and making it available for the use of manufacturers having contracts for Navy goods. Particulars as to the weight of this wool were not given out, but the wools bought included 38 per cent. twelve-months' Texas, 20 per cent eight-months' Texas, 12 per cent Montevideo merino clothing and 30 per cent Chubut merino clothing.

It is needless to say that this was a radical departure from all previous Government procedure, and moreover included certain innovations in trade practice. As offered to manufacturers, these wools were to be blended so that each buyer could be absolutely certain of getting just the same quality and price cost as his neighbor. Manufacturers having Navy contracts were not required to use these wools, but were allowed and requested to do so, provided the market went against them, and they were not able to cover at a reasonable figure. Prices fixed were in the grease, and no guarantee of clean cost was given, though it was expected that this would be around $1.60.

FIRST GOVERNMENT BUYING

While the amount of wool involved in the Navy transaction was relatively small, supposed to be about 2,000,000 pounds, great importance was attached to the matter, as it was apparently the entering wedge of a broader movement for control by the Government of the price and movement of wool. Such control already existed in England, where the British War Trade Department had been given absolute authority over the wool and wool manufacturing industries. As it appeared from both commercial reports and private advices that the allied trades in the United Kingdom were getting into a lamentable condition as the result of this control, there was no wish to see such a system duplicated on this side of the water. On the contrary, there appeared to be every reason why all legitimate measures should be taken to stave off the possibility of official control in the United States.

Meanwhile speculation was rampant, values were mounting, and it became apparent that the efforts of the Government to equip the new army were likely to be greatly hampered by the way the wool situation was being handled. Accordingly, at a private meeting of a few of the leaders held on July 30, it was decided that something ought to be done. A meeting of the Boston Wool Trade Association was called for the same afternoon by telephone, and the plan presented was discussed and heartily endorsed. By noon on Wednesday, Aug. 1, fully 95 per cent of the houses in the trade had signed the agreement drawn up at the meeting, and later practically every house having any wool to offer entered into the movement.

In brief, this agreement bound the signers to sell to the Government 50 per cent of all the unsold wool in stock in Boston, or due to arrive later, on the basis of the values prevailing during the week preceding July 30. Other wool markets of the country were invited to participate in the movement, and favorable responses received showed that practically the whole wool trade of the country was lined up for patriotic service in this manner. It will be noted that this differed from the earlier offer in a material way, especially in that only 50 per cent of holdings were tendered and that no restrictions were placed on trading, pending the acceptance or rejection of the offer by the Government.

Washington was by now better organized to care for the needs of the Government departments, and the proposition that the War Department be allowed to purchase needed supplies of wool direct, as the Navy Department had already done, met with prompt approval from the Council of National Defense, as well as from high officials in the War Department itself. Official acceptance was announced Aug. 6, and arrangements were at once perfected for the reception and examination of samples, and the transaction of the necessary formalities connected with the transfer to the Government of so large a volume of wool.

Connection with the National Council of Defense was established through Jacob F. Brown, senior member of the firm of Brown & Adams, Boston, and with him were associated as a Committee on Wool Supply, Stephen O. Metcalf, treasurer of the Wanskuck Company, Providence, R. I., and Frederic S. Clark of Billerica, Mass., president of the Talbot Mills. Robert H. Stevenson, Jr., of Farnsworth, Stevenson & Co., Boston, was appointed secretary of the committee, headquarters being established on the second floor of the Brown & Adams store at 273 Summer street, Boston. Major William B. Gracie was detailed by the Quartermaster's Department to handle vouchers and make payments for wool purchased.

Actual details of wool examination and pricing were placed in the hands of three committees of wool experts, each consisting of nine members, elected by the votes of the signers to the agreement. These valuation committees were organized with Albert W. Elliott of Jeremiah Williams & Co. as chairman of the committee on greasy domestic wool; John Wilcock, of Francis Willey & Co., as chairman of the committee on greasy foreign wool, and Robert L. Studley of Studley & Emery, as chairman of the committee on scoured wool and tops. In addition to the chairmen named above, the valuation committees included such well-known names as Carl K. Bacon, Paul Clifford, William A. English, Horace C. Jealous, Edmund E. Hills, Joseph F. Kesseler, L. W. Rand, and Walter P. Wright, on the committee on scoured wool and tops; Louis Baer, James Driver, James S. Farquhar, Frank W. Hallowell, Vaughan Jealous, Abraham Koshland, Charles J. Nichols and Joseph Wing, on the committee on greasy domestic wool; and Lewis Balch, Frank R. Pratt, F. R. Edington, William Ellery, Conrad Hobbs, Walter J. Meadows, Samuel C. Murfitt, Charles P. Nunn and J. A. Paton, on the committee on greasy foreign wool. Other committees were Charles F. Avery, Ludwig Eisemann and William E. Jones, on guarantees; and William E. Maier, A. E. Ferguson and J. S. Stressinger, on qualified weighers.

Samples of wool began to pour in immediately, the first sample being received on Aug. 14, and the work of examining, pricing and passing the lots offered was soon under way, though no actual transfers were made until about Aug. 25. No statement has ever been issued showing the actual amount of wool bought in this way, but under date of Sept. 21 it was announced that the various valuation committees had examined 851 different lots of wool and tops up to Sept. 18, covering 40,508,225 pounds of raw material. Offerings by pounds by the various wool markets of the country were as follows: Boston, 35,079,835 pounds; Chicago, 2,324,150 pounds; Philadelphia, 1,549,200 pounds; New York, 621,800 pounds; other markets, 933,240 pounds.

Buying was formally suspended on Oct. 27, and the trade is still entirely

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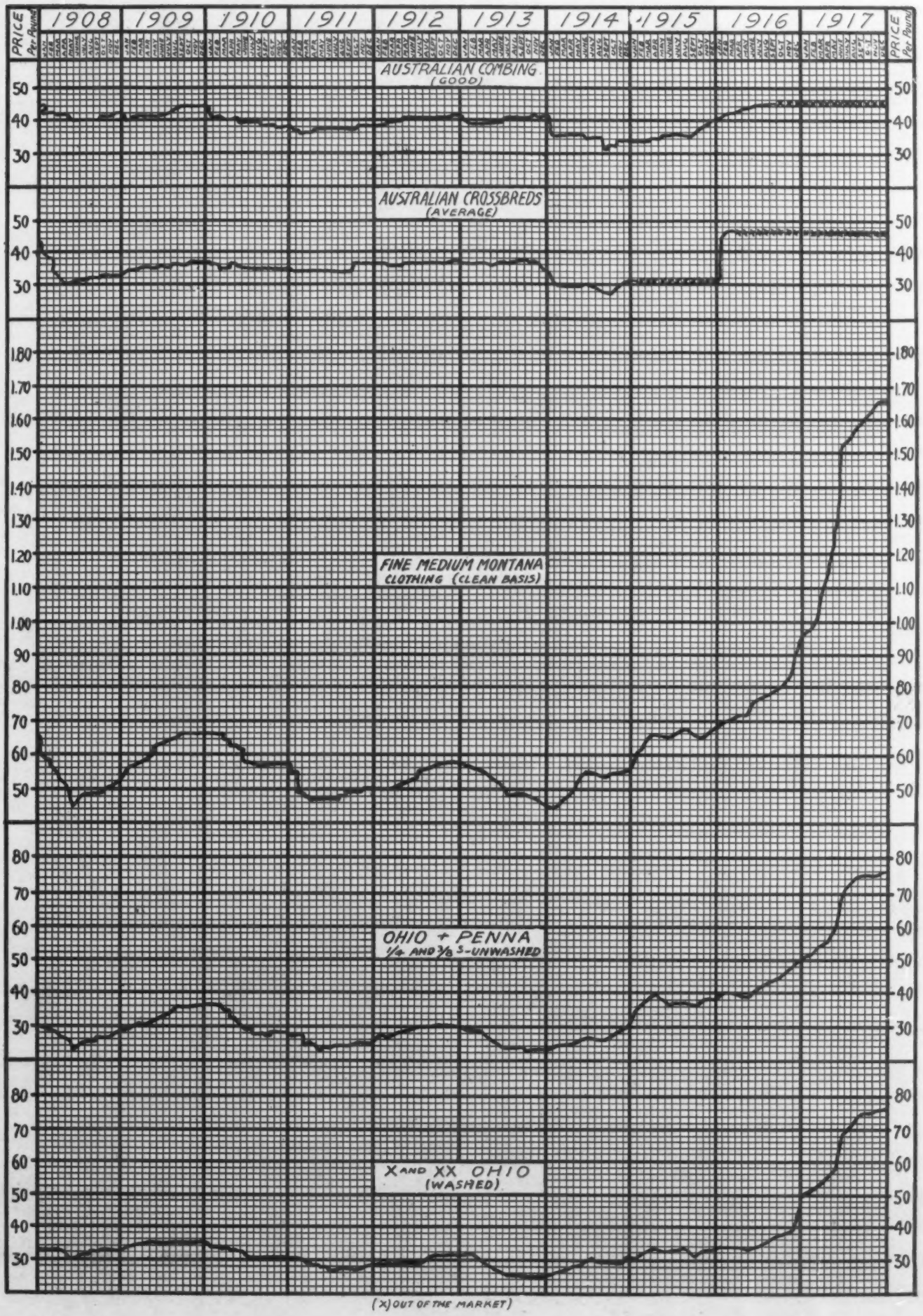

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in the dark as to the amount and grades of wool bought, or the prices paid, except that each house, of course, knows the particulars of the transfers in which it was directly interested. In one way the efficiency of the Committee on Wool Supply, and the success of the method adopted, were signally shown. Wools bought were paid for immediately, without the vexatious delays experienced in other trades having dealings with Government departments. In some cases the certified checks were in the hands of the sellers within 24 hours after the details of sale had been completed. Much satisfaction was expressed over this feature, which tended to compensate in some measure for what were sometimes considered low prices.

No further developments of importance in this connection were noted until after the opening of Congress and the resignation of the advisory committee of the National Council of Defense. This led to a cessation of the efforts being made by the Boston Wool Trade Association to limit the prices to be paid for the new South American clip, and to curb speculation in every possible way. All powers hitherto exercised by various committees in the wool trade were taken over by the newly-appointed War Trade Board, and under date of Dec. 14, it was announced that on and after Dec. 15, applicants for licenses to import wool, these licenses having previously been provided for by special regulation, must sign an agreement that they "will not sell the wool covered by said application, or any other wool of either foreign or domestic origin, to any person other than a manufacturer, without the consent of the War Trade Board; and that in the event of a sale to a person other than a manufacturer with such consent, they will exact from the purchaser a similar agreement."

Further, the applicant for a license is required to give the United States Government an option on all or any part of the wool covered by the application for "ten days after Custom House entry thereof, and thereafter on such portion thereof as shall be at any time unsold until the whole amount thereof has been sold by the importer. In the event of the exercise of such option, the basis of price to be paid for the wool shall be equivalent to 5 per cent less than the basis of price of July 30, 1917, as established by the Valuation Committee of the Boston Wool Trade Association, the actual price of each lot to be determined by a committee to be appointed jointly by the Boston Wool Trade Association and the United States Government." Applicants for import licenses must "file with their first applications copies of all their contracts outstanding on Dec. 15, 1917, for the importation of wool from foreign sources, and as to which all wool contracted for had not been entered at any United States port of entry Dec. 15, 1917, and showing in detail the amount of wool already shipped and the amount yet to be shipped thereunder." Exports of commodities containing wool are also subject to license, but "no licenses will be granted for the exportation of any commodities containing wool which are necessary or desirable for the military or naval uses of the United States."

The above action of the War Trade Board was taken under the powers included in the Trading with the Enemy Act, which authorized the refusing of import licenses when compliance with the necessary conditions is lacking. The Textile Alliance has been made the agent of the War Trade Board, and will act in a clerical capacity, as it has heretofore acted for the British Government in matters pertaining to importations of Colonial wool into this country. It has no "authority whatsoever in the granting or refusing of import licenses, or in any way on its own initiative to determine who shall or shall not import these commodities, or determine their disposition." It will exercise the prescribed functions over imports of wool and animal hair, wooled and haired skins, jute and burlap, including bags; cotton flax and mica.

Naturally this drastic move on the part of the War Trade Board made considerable of a flutter in the wool trade. One of the first results noted was the prompt cancellation of all buying orders in South American and Cape markets, and these are not likely to be renewed until those markets get down to a parity with the July 30 price list of the Committee on Wool Supply. The valuation committees have been called together again, and are engaged in the work of extending and reclassifying the lists, in the interest of clearness, as well as to establish values for grades not included in the original list.

BUYING SOURCE OF STRENGTH

Thus briefly outlined are the main facts connected with the Government's operations in this market. Undoubtedly Government buying has been a source of strength, for in early July, just before the second offer was made by the wool trade, there was a feeling of hesitancy in the market, and some members of the trade went so far as to predict that "twelve o'clock had been struck in wool values." From July 30, there was no longer any appearance of weakness in the market, though it was very early developed in the proceedings that the whole weight of the influence of the Committee on Wool Supply would be devoted to the task of keeping down values, rather than raising them. In fact it was often heard on the street during late August and early September that the Committee on Wool Supply and its assistants "seemed to be representing the Government rather than the wool trade."

This feeling was heightened by the list of "fair" prices put out by the Committee on Aug. 27, which was stated to be the maximum that the Committee would authorize to be paid. Naturally, there was some friction over the operations of the Committee, as some sellers put prices on their samples much higher than those fixed by the valuation committees. Even when owners were allowed to make re-offers of rejected lots, as was done early, it was difficult to find the point of agreement. Thus it followed that while some houses sold wool freely, others were able to dispose of very little. This feeling of dissatisfaction, if such it may be called, was heightened by the action of manufacturers, who bought freely in September, taking wools similar to those bought by the Government, in some cases buying lots refused by the Committee, and even an occasional lot which had been twice rejected. For these lots they paid prices much above the Government schedule, and it was not uncommon for a rejected lot to bring 6 to 7c. above the Committee's maximum price.

Criticism of the Committee's attitude is said to be based on a mistaken view of the situation. There has been great danger of commandeering of the wool supply by the Government. If the wool trade plays a moderate game, and does not resort to unwise profiteering, this danger may be avoided. Reckless speculation, unfounded claims of a shortage in the wool supply greater than really exists, and injudicious boosting of values when a more conservative course would be advisable, will tend to precipitate conditions similar to those now existing in England, where independent action by the wool trade or wool manufacturers is no longer possible.

THE AUSTRALIAN WOOL PROBLEM

Throughout the greater part of the year, the possibility of the importation of any material weight of Australian wool was treated as more or less of a joke by the Boston wool trade, and it was not until November that a more serious turn was given to the situation. England had commandeered the total wool clips of Australia and New Zealand, and was reserving the wool supply thus secured to cover the war needs of herself and her Allies. Even the little burry and defective wool bought by Americans prior to the commandeering of the Australian clip by Great Britain, Nov. 18, 1916, had been held up. There was less than 10,000 bales of this wool, but all efforts to secure its shipment, or even to obtain an official ruling regarding its disposal, proved of no avail.

Around the first of the year there was considerable agitation here and in Washington over the question of obtaining wool from Australasia. As importations from thence for the wool year ending June 30, 1916, had mounted to the tremendous figures of over 564,000 bales, it was rightly felt that it would be a hardship to have so large a source of supply permanently closed. American manufacturers entered the new year with little prospect of getting any wool from the Antipodes, though some wool men were "hoping against hope" that shipments of burry and defective wools might be allowed later.

This was the situation when President William E. Jones, at the Boston Wool Trade Association dinner, at the Copley Plaza, Jan. 16, electrified the members by reading a letter from Sir Richard Crawford, Commercial Adviser to the British Embassy at Washington, stating that "the extent of the military requirements of the Allies is still uncertain, so that the total amount of Australian wool which can be spared for America this year cannot be ascertained. His Majesty's Government, however, is anxious to meet the needs of American manufacturers as far as possible, and will in the meantime arrange to liberate 50,000 bales of Australian wool for America on account. When this quantity shall have been exported it is hoped that further amounts will be available." The letter also stated that 5,000,000 pounds of carpet wool was to be allowed to be exported to the United States this year, and immediate shipment was promised to be granted on certain coarse wools, unfitted for military requirements, that could be shown to have been contracted and paid for previous to the placing of the embargo on the export of wools from the United Kingdom in February, 1916.

This was in accord with previous rumors, and at the most was merely construed by the wool trade as a conditional promise to supply a limited volume of wool to the United States, "if possible, when possible, and where possible." This promise was placed on file with various others of similar purport, but for many weary months nothing came of it. In view of the big imports of Australian wool during the early part of 1916, the offer of 45,000 bales was considered to be simply an effort to allay the just criticism that had been aroused by the attitude of the British authorities towards American importers.

Late in January it was proposed that 5,000 bales burry and faulty Australian wool should be released at once for America, to be shipped direct to Boston, and there offered at auction under the auspices of the Textile Alliance. While the possibility of securing the wool was appreciated, the method of distribution was not approved by the trade, and after a conference between officials of the Textile Alliance and representatives of the wool trade, the matter was allowed to drop for the time being. This was followed by renewed efforts to secure permission from the British Government to allow the sale and shipment of wool direct from Australia to Boston, but without effect, though about March 1 it was rumored that Great Britain had finally decided to take over the few thousand bales bought by Americans prior to the date when the Australian clip was commandeered.

In an evident effort to test out the American market, and to determine whether the needs of American manufacturers were as acute as claimed, the London auctions were opened for two days at the March sales, March 29 and 31, to American buyers, and purchases up to 10,000 bales authorized, to include fine merinos, 60s and above, and burry and scoured wool. Prices ruled so much above the Boston market, however, that only 4,000 to 5,000 bales were bought, the amount actually obtained varying with the different cables. As the London sales were definitely canceled in April, and no sales have been since held, there has been no opportunity to test the matter.

During May, June and July there were many rumors afloat on the "Street" regarding the shipment of Australian wool to this country, with now and then an official conference over the question, of sufficient importance to keep the interest alive. In the latter month, the Textile Alliance announced that the 45,000 bales to be released for shipment from Australia to this country, would be consigned to that organization and sold at auction. As it was announced about the same time that the British Government had taken over the new Australasian clip, there appeared to be no chance of getting any wool from Australia, except through official channels.

Early in August, renewed interest was aroused by the announcement from the Textile Alliance that the Central Wool Committee, Melbourne, had been instructed to grant permits for the shipment of American-owned wool bought prior to Nov. 23, 1916, such permits having been previously refused. This decision was soon reversed, the later action being due, it was claimed, to the attitude of Premier Hughes, who took the ground that these purchases were not authorized, that they were purely speculative, and consequently were at buyers' risk. This marks the disappearance of the last wool bought by private buyers in the Australian market. Later in the same month, Secretary Redfield announced from Washington that he had secured the release of 25,000 bales of Australian wool, but this appears to have disappeared in the shuffle, though there were many rumors, and as frequent denials afloat in the trade at this time.

CHANGE OF POLICY NEEDED

It became evident that an entire change of policy was necessary, if the United States was to get any wool. It was understood that the British agents complained that nobody seemed to know how much or what kind of wool was wanted. Officials were obviously in need of expert advice, something not obtainable through ordinary diplomatic or consular channels. Following a visit to England of President Patterson of the Textile Alliance, it was announced that Charles W. Bigelow, of the house

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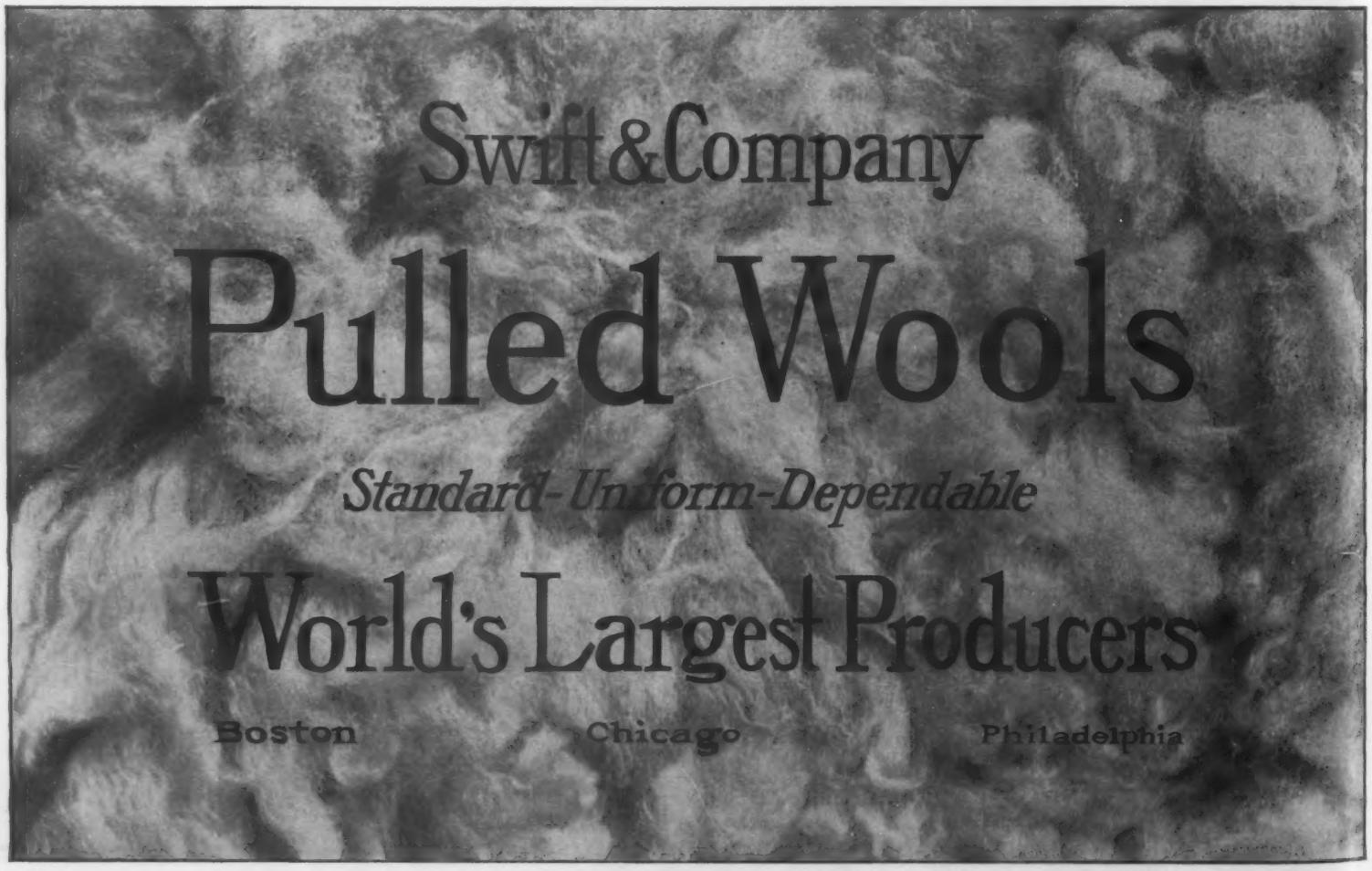

of Mauger & Avery, Boston, had been appointed as adviser on wool topics to American representatives. At this time (early September), it was stated that samples of wool had been examined in London and a selection made of the 45,000 bales to be shipped to the United States. It was further announced that Frank B. Windeler, a well-known London wool broker was to come to America to superintend the sales and act as auctioneer.

This seemed to bring nearer actual imports of wool, and with the later appointment of Fred H. Booth of Sydney, and Fred R. Bennett of Melbourne as agents in Australia for the United States Government, to attend to the details of selection, shipping, etc., the matter was considered clinched. Good results immediately followed the accelerated team work made possible by the appointments named, and a more efficient presentation of the case to the British authorities. This was clearly proven, when on Oct. 5, the Committee on Wool Supply reported that the definite plans had been matured for the release of the 45,000 bales so long promised, which was to be sold at auction, and also of 25,000 bales for the use of the Navy Department, 200,000 bales for the War Department, and 20,000 bales of East Indian wool, which was also to be sold to the trade.

About the same time, the Textile Alliance was officially informed that the first shipment of wool had been made from Australia, on account of the 45,000 bales, and that the balance was being loaded into fast steamers for immediate shipment. From this time, things seem to have moved with a promptness that contrasted sharply with the dilatory movements of the previous nine months. Mr. Windeler arrived in this country in the latter part of October, and negotiations were soon under way for warehouses for the proper storage and inspection of the wool, and a suitable place for holding the auction sales. The latter was found in the Board Room of the Boston Chamber of Commerce, and storage room was offered by several of the leading houses. At Mr. Windeler's suggestion, the following committee to co-operate with him in arranging the details of the auctions was appointed by the Executive Committee of the Boston Wool Trade Association: William E. Jones, of Hallowell, Jones & Donald; Albert W. Elliott, of Jeremiah Williams & Co.; A. Koshland, of J. Koshland & Co.; Ludwig Eisemann, of Eisemann Bros., and W. R. Cordingley, of Cordingley & Co., Inc.

Under date of Nov. 14, the Textile Alliance notified the wool trade that the first shipment of the 45,000 bales had arrived at Vancouver and was due to arrive in Boston early in December. This shipment included 1,100 bales superior merino combing, 1,200 bales shafty top-making merino, 800 bales clothing, 64s to 70s, and 1,600 bales combing merino pieces and bellies. The second shipment consisted of 35,147 bales and arrived in Boston by direct steamer Dec. 19, and the balance similarly shipped is due at this writing.

Catalogues of the first auction were mailed to applicants just after Christmas, 20 per cent of each lot offered being on view at the new warehouse of Hallowell, Jones & Donald, 415 Summer Street, Dec. 31 and Jan. 2 and 3. There is a tremendous amount of interest in these auctions among the wool houses, accompanied by considerable curiosity as to what effect the latest action of the War Trade Board will have on prices. As the wools were repressed before leaving Australia, two bales being forced into the space of one, and when opened did not "come back" as desired, it has been extremely difficult to draw suitable samples, or to value the wool properly. Possibly this may have some effect on prices realized.

MOST STARTLING INNOVATION

Wool men say that the proposition to establish a wool auction in Boston is the most startling innovation yet brought about by the war. There have been several efforts to establish wool auctions, especially in New York, but the Boston wool trade has never taken kindly to the idea, though most wool importers have had experience at such sales in London or the Colonies. An excellent opportunity will be given to test the temper of the trade, and the feasibility of the auction method of selling wool. Thus another broken precedent is placed among the war trophies of the trade.

Sentiment in Australia and New Zealand seems to be entirely favorable to the system of Government buying which has been in operation for a year past. Premier Hughes of the Australian Commonwealth is on record as having said publicly that the purchase of the Australian clip by the British Government was a financial godsend to Australia. This is borne out by the ease with which the arrangements were completed for the control of another year's clip, both in Australia and in New Zealand. It is understood that the tonnage problem is the biggest one that confronts Great Britain, and that the Colonies would be helpless in the face of such a problem, if they undertook to market their wool clips independently of the Government.

One good result was early seen following Mr. Windeler's arrival in this country. Negotiations were immediately opened in regard to the wools bought by American houses, or contracted by them, in New Zealand, and which under the operations of the embargo declared later they were unable to ship. This only applied to wools actually bought in 1915, before notice was served on the buyers, that only a certain volume would be allowed shipment. It was intimated that the British Government desired to treat American buyers fairly, and consequently would release to the earlier buyers as above stated, an equivalent quantity and quality of New Zealand crossbreds from the new clip, at slightly under the Government issue price, on condition that such wool is used for United States military requirements, and to be distributed under the auspices of the Textile Alliance. This will allay a feeling of irritation that has existed in the trade since the early part of 1916, and will go far toward proving to the United States that Great Britain recognizes its claims to be considered as an Ally.

SOUTH AFRICAN GROWERS BALK

Notwithstanding the favorable conditions existing in Australia and New Zealand, and the satisfaction felt by the wool growers in those colonies, the British Government has found it impossible to make a similar arrangement with the wool growers in the Union of South Africa. Boston wool houses were very heavy buyers in the Cape Colony and in Natal last season, over 140,000 bales having been shipped to this country during the calendar year 1916, while since Jan. 1, practically the only restriction on such shipments has been the lack of tonnage. Some of the more enterprising Boston houses have gotten around this difficulty by chartering sailing vessels to go to the Cape and bring back wool, and this is working out well. Arrivals at Boston, direct from South African shipping ports, from Jan. 1 to Nov. 30, were 11 steamers with 100,633 bales, or 36,742,555 pounds, and four sailing vessels, with 21,504 bales, or 7,933,210 pounds. This is a total for 1917 to Dec. 1, of 122,137 bales or 44,675,765 pounds.

In July it was cabled from South Africa that the British Government was endeavoring to secure the South African clip on terms similar to those that had worked so well in Australia. Later advices said that the offer was an advance of 55 per cent over the quotations current in 1914, before the war. At a meeting of the representatives of the Government and the wool growers, held at Pretoria, July 27, it was voted, 46 to 28, to recommend to the Wool Growers' Association that the offer of the Government be accepted. This appeared to be conclusive, and anticipating conditions similar to those existing in Australia some buyers were ordered home. Later there was a hitch in the negotiations, and as the Government did not care to commandeer the clip, or even to use any undue coercion, the matter was settled by allowing the growers to exercise individual preference. America and Japan were buying freely and paying high prices, and some of the growers objected to being tied up to the Government on a lower basis. According to latest advices, the Government has already secured over one-third of the clip of South Africa, or about 175,000 bales, against about 50,000 bales secured by private treaty. Unless the private treaty buyers are able to supply the necessary shipping, the Government appears to have the upper hand through its control of all British tonnage.

Tremendous advances have been made in values of Cape wools both here and in South African markets since last January. At that time good combing wools were quoted on the clean basis of $1.15 to $1.25, which was just about what similar wools could be laid down in Boston for. Recent sales here of this grade have been made as high as $1.70 clean, with French combing at $1.50 to $1.60 clean. Some fine clothing Cape wool sold as high as $1.60 clean for a choice lot, but $1.50 was about the going price for some time for good wools. Recently, heavy arrivals of scoured wools, as well as greasy, and the putting on the market of lots of locally scoured wools, seems to have temporarily glutted the market, sales of scoured having been made at $1.40, and even lower for some Colonial scoured wools of relatively large supplementary shrinkage. At the beginning of the year, fine clothing Capes were quotable on the clean basis of 80 to 90c., the lower figure being for cheaper scoured lots.

GREAT ACTIVITY IN SOUTH AMERICA

With Australia and New Zealand absolutely closed to American buyers, and only fine wools available from the Cape, the attention of American buyers was sharply directed to South America as a source of supply of the crossbred wools needed for army contracts, as well as for worsted work for civilian contracts. This resulted in very heavy purchases in River Plate markets by American buyers throughout the year. The extent to which this shifting of the source of supply of crossbreds wools has been carried, is indicated by the latest reliable Argentine advices. According to the figures thus obtained, the purchases for the wool year just closed were 222,085 bales from Argentina and 45,950 bales from Uruguay. These figures compared with 150,000 bales from Argentina and 9,572 bales from Uruguay for the previous year, 103,000 bales from Argentina, and 15,000 bales from Uruguay in 1914-15, the first year of the war.

Perhaps more clearly still, comparison of last year's figures with those for the wool year 1912-13, when the United States took only 26,000 bales from Argentina and 2,700 bales from Uruguay, will indicate the amazing strides made in the purchase of the South American clip for the use of American mills. Further confirmation of this view of the situation is found in the fact that shipments of Argentine wool from the River Plate for the first seven months of 1917, broke all records, the total being 226,354 bales, compared with 191,242 bales for the same period in 1916, 225,265 bales in 1915, 224,692 bales in 1914, and 195,703 bales in 1913. Of the 1917 shipments, the United States took 151,718 bales, France 21,909 bales, Great Britain 21,576 bales, Italy 18,541 bales, the balance going to the Netherlands, Sweden, Denmark and other countries.

This year, the season started off with a very active period of contracting, American and German buyers competing for the best clips. These contracts have been made at figures nearly double those that prevailed under similar conditions a year ago. Now, as then, German competition is the unknown factor in the situation; in fact, correspondents say that Germans have been paying top prices in order to keep Americans from getting needed supplies, though this must be taken with some allowance, as equally well authenticated information gives German holdings from the old clip as 50,000 bales, of which nearly half is held in Uruguay.

The extent to which this country is relying on South America for its wool supply is shown by a compilation from the books of the Boston Chamber of Commerce, showing that during the period from Jan. to Dec. 1, 1917, 42 steamers arrived at the port of Boston from the River Plate, with 152,199 bales, or 150,020,440 pounds, of wool. This does not include a large volume of wool which arrived at New York and was transhipped to Boston.

SURPRISING ADVANCE IN VALUES

Whatever the cause, values have shown a surprising advance within a year. This is true of the Boston market as well as of the primary markets in South America. Already the highest price ever realized in Argentina has been paid, though whether for American or European account is not stated. American buying has cleaned up all accumulations of burry wools, as well as the second clip and lambs' wool of late shearing, paying high prices therefor. It is claimed that standard wools have not been taken freely since they begun to arrive at the Central Market, the season there being unusually late owing to a long railroad strike, just as the season was opening.

Larger houses here deny that they have yet dipped in very deeply in buying the new Argentine crossbred wools. Some confirmation of this is found in the way the Buenos Aires market has sagged off lately. At the top certain round lots of 3s, 4s and 5s were quoted at a figure that made them sure to cost fully 80c. c.i.f. Boston. Late quotations indicate 73 cents as about the current figure, c. i. f. Boston. Market conditions in Argentina have been greatly complicated by the persistent proposal on the part of the Argentine Government to impose an export duty on wool. Several times the report has been cabled that such action had been definitely taken, but as far as known here it is still being considered. At one time during the summer it looked as though Argentina was surely drifting into war with Germany, something fraught with the possibility of serious developments for the Entente Allies. This would have put a definite period to German buying in that country, though Uruguay would still have been open.

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Mill Delivery, No Freight or Drayage

At no time during the late summer or fall has the Boston market been on the parity of the cabled offers from the River Plate, though record prices have been made. At the beginning of the year Buenos Aires Lincolns were quoted in this market at 50 to 52 cents, while the best quotation available to day for the same grade is 69 to 70c. It is reported that a small lot of choice wool sold at 71c., but this was exceptional. Current quotations are 5 to 6c. above those prevailing July 1, which is all the more remarkable from the fact that Lincolns were barred from the operations of the Committee on Wool Supply for Government account, such purchases being limited to the grades from half-blood to quarter-blood.

In late November a strong movement was inaugurated to curtail speculative buying in South America. This movement was proposed at the anuual meeting of the Boston Wool Trade Association, Nov. 20, by Chairman Jacob F. Brown of the Committee on Wool Supply. After discussion, the matter was referred to a committee consisting of Charles F. Avery of Mauger & Avery, Carl K. Bacon of Winslow & Co., Inc., Louis Baer of Eisemann Bros., Samuel W. Bridges of Ayres, Bridges & Co., Harold S. Edwards of Francis Willey & Co., Albert W. Elliott of Jeremiah Williams & Co., Frank W. Hallowell of Hallowell, Jones & Donald, Simon E. Hecht of Hecht, Liebmann & Co., Joseph F. Kesseler of Swift Wool Co., Abraham Koshland, ex-officio, of J. Koshland & Co., Charles P. Nunn of Dewey Gould & Co., Edward R. Peirce of Crimmins & Peirce Co., and Robert L. Studley of Studley & Emery.

This committee held several meetings, and the result of its findings, already printed in the TEXTILE WORLD JOURNAL, were referred back to the committee, owing to developments at Washington, the report suggested that the wools owned by the Government be offered to manufacturers immediately, and the pledge to the Government at any time during the next six months of one-half of all holdings of new clip South American wools held at the time of the call, at the Boston market price of Nov. 28.

Earlier in the month, when there threatened to be a runaway market for low scoured and carbonized South American wools, the trade had been asked by the Committee to voluntarily curb speculation, and this object had been accomplished to a great extent, even though it was found advisable to ask for direct pledges on the lines as first laid down.

Thus far the efforts to depress South American markets to what is considered a reasonable basis of values by Boston importers, and especially to the limits prescribed by the War Trade Board in the regulations of Dec. 15, have had very little effect. Fluctuations have been reported from time to time, but as this is written the Buenos Aires market is reported stagnant at practically unchanged prices. The situation was complicated by a report from England that the British Government was encouraging buyers from the United Kingdom to operate in the River Plate markets and promising the necessary tonnage for such purchases. Argentine papers contained information of a similar character, reports from both sources saying that the British Government would require an option on all purchases, at a small advance over cost. Such offers as have been cabled to Boston show a cost considerably above the July 30 basis, while bids on about the parity of that list are being turned down. The decline in exchange has still further complicated the matter, and the outlook for any material volume of American buying in River Plate markets in the near future is not very promising.

Underlying all these efforts to limit speculative buying and to restrict trading to the covering of legitimate trade channels, has been the fear of Government regulation of trading in wool, and the fixing of prices, if not the actual commandeering of wool stocks. Leaders in the trade have worked hard to prevent such action, which might easily be precipitated by unwise exploitation of the market at this time. Certain influences are at work in this direction, notably the wool growers of the West, who asked that 55c. be fixed as the minimum price of wool, based on a shrinkage of 63 per cent and the wool trade of Philadelphia, which made an offer of its wool to the Government under certain conditions, which offer was declined.

DOMESTIC WOOLS ON HIGH BASIS

At no time during the year has there been any lagging behind the main procession toward higher levels on the part of domestic wools. In fact the top price of the year on actual sales was made in the summer, when a little lot of scoured AA super pulled wool sold at $2 a pound. With fine staple Territory wool quotable at $1.80 to $1.85, the domestic grower has no reason to think that his product is neglected. Both Territories and fleeces have sold at the highest figures current since the Civil War, and when the difference between gold and currency then and now is considered, at the highest level ever known.

Wool quotations current at the end of 1917, compared with those current at the beginning of the year, are as follows:

	Dec. 1, 1917.	Jan. 1, 1917.
Ohio fine washed delaine	$0.82@0.85	$0.52@0.53
Ohio XX and above	.75@ .77	.47@ .48
Ohio fine unwashed delaine	.75@ .77	.44@ .45
Ohio fine unwashed clothing	.65@ .66	.38@ .40
Ohio half-blood combing	.77@ .78	.46@ .47
Ohio three-eighths-blood combing	.76@ .77	.48@ .49
Ohio quarter-blood combing	.75@ .76	.47@ .48
Fine staple Territory, clean basis	1.80@1.85	1.10@1.15
Half-blood staple Territory	1.75@1.80	1.00@1.05
Three-eighths-blood staple Territory	1.45@1.50	.95@1.00
Quarter-blood staple Territory	1.25@1.35	.85@ .90
Fine clothing Territory	1.65@1.70	.95@1.00
Fine medium clothing Territory	1.55@1.60	.90@ .95
Twelve-months' Texas	1.65@1.70	.90@1.00
Eight-months' Texas	1.55@1.60	.85@ .88
Eastern B super pulled	1.50@1.60	.75@ .80
Western B super pulled	1.40@1.45	.73@ .77
Buenos Aires high quarters, greasy	.77@ .79	.54@ .56
Buenos Aires straight quarters, greasy	.74@ .75	.52@ .54
Buenos Aires Lincolns, greasy	.69@ .70	.50@ .52
Cape good combing, clean basis	1.60@1.70	1.15@1.25
Cape French combing, clean basis	1.50@1.60	1.05@1.10
Cape fine clothing, clean basis	1.40@1.50	.80@ .90

BIG CONTRACTS ON TERRITORIES

Heavy contracting of Territory wool marked the beginning of the year. At that time, it was estimated that about 10,000,000 pounds of wool were under contract, mainly in Nevada, which was said to be about 75 per cent sold, and in Utah and Western Idaho, with a few clips in Montana. One notable development of the season was the entry into the contracting field of a big Western land and cattle company, which is reported to have grown about a million pounds of wool, and to have bought and contracted for 15,000,000 pounds from other growers. With headquarters in Nevada, it entered the field in that state early, and was reported to have secured a large proportion of the wool in that state, at prices ranging from 28 to 30c., or about 90c. to $1 a pound, clean cost landed here.

Early in the year, contracts were freely made in Utah at 34 to 35c. for average wools, and up to 36 to 37c. for choice clips. In Western Idaho, 29 to 30c. was being paid at this time for fine clips and 32 to 33c. for medium. January average clean landed cost for fine wools was about a dollar a pound. At this time, growers were not at all anxious to contract their wools, and indeed this was their attitude for a large part of the season before shearing. For a time buyers and sellers were apart, but by the middle of February there was renewed interest in the situation. Dealers were obliged to meet the more advanced views of growers, though the relative gain in values was not great nor too rapid. At this time contracts were being made in the Triangle and Soda Springs districts at 38 to 40c. for medium clips; in Western Idaho at 30 to 32c.; in Montana at 40c.; in Utah at 35 to 37c. for fine and half-blood clips, and in Arizona at 38 to 40c. for the best clips.

SPECULATION RUNNING HIGH

By March 1 the speculative fever was running high in the West, largely stimulated by the operations of the company above mentioned, which was credited with paying previously unheard of prices, with the evident aim of getting all the wool possible. At this time its holdings were estimated at 6,000,000 to 10,000,000 pounds, and the total under contract in all sections as 30,000,000 pounds or more. About this time 45½ and 46c. were paid for separate clips in Montana, showing a clean landed cost of $1.17. In other sections medium clips were selling at 38 to 41c. and fine clips at 35 to 38c. Utah and Nevada were estimated at this time to be 75 per cent sold, Western Idaho 50 per cent, and other sections 25 to 30c.

During the first half of March buying competition was very keen and a very large volume of wool was placed under contract. By March 15, the total volume of contracts was estimated at 40,000,000 to 50,000,000 pounds, of which amount a single interest was said to have secured 15,000,000 pounds. So much competition was developed that growers became alarmed, and jacked their asking prices to what were considered exorbitant figures. It was commonly reported at this time that growers seemed to be afraid to quote prices for their clips lest buyers take them up. Some clips were held at this time at 50c., a figure later reached and passed. Late storms caused heavy losses on the ranges, but this had little deterrent effect on contracting.

Both contracting and wool buying were stopped for a time, under the terms of the offer made to the Government in April, but nothing was lost thereby, as shearing was delayed by storms and bad weather. As soon as it was definitely known that the Government had turned down the offer of the wool trade, contracting was renewed on a large scale, the going prices at this time, about April 15, being 40c. for fine, and 45c. for medium clips, with many growers holding firmly at 50c., this figure being reached before the end of the month. Buyers for the leading mill interest became active about this time, and were reported to be "taking everything in sight," securing about 1,500,000 pounds medium wool around Dillon, Montana, at 50c. This was said to mean a clean landed cost of $1.20 for three-eighths-blood.

WHOLESALE TRANSFER OF CONTRACTS

In April there was a wholesale transfer of the early contracts to mill interests. Actual prices realized were not stated except in a few cases, but western Idaho wools are known to have been turned over at 45 to 46½c., and contracts made in other sections are said to have shown equally large profits. Capital thus released was immediately turned back into wool buying, and increased excitement and competition was inevitable. At this time 51½c. was paid in Montana and 52½c. in Arizona. By the first of May it was estimated that fully two-thirds of the year's growth West of the Mississippi River had been sold or contracted to dealers or manufacturers, with the states of Montana, Idaho, Utah and Nevada 80 per cent sold.

Considerable was done at this time in Wyoming at 40 to 45 cents, and in Idaho at 40 to 42 cents for fine and 45 to 47 cents for medium, though as high as 50 to 51 cents was paid in the latter state for choice clips. While the center of interest was being transferred to the East, there was a steady movement of the unsold remainder of the Territory clip at constantly advancing prices. By the middle of May some choice clips were held at 60 cents, and a fortnight later this figure was being bid and refused. In early June the going price was 54 to 55 cents in Wyoming, 50 to 52 cents for fine and 53 to 55 cents for medium in Western Idaho and Oregon, and 55 to 57 cents in Montana. Buying was practically over in the Territory wool sections by the end of July, the latest prices paid being 55 to 63 cents in the different sections, the top price of the season, 62½ cents, being paid in Montana.

TERRITORIES IN FIRM POSITION

Throughout the year, Territory wools have been in firm position, especially for fine staple and half-blood wools, which were in excellent demand when the year opened and have continued active and firm since that time. Three-eighths blood wools were in best supply early, and as for a time they were somewhat neglected by manufacturers there was an unusual widening of the differential between this and the half-blood grade. However, heavy sales of this grade late in January and early in February did something to restore the balance of the market, though the half-blood grade has been in an abnormal condition for very much of the time. Prices paid for three-eighths-blood wools at this time was 42 to 46 cents, and a little later 44 to 47 cents, clean cost ranging from 95 cents to $1 early and $1 to $1.05 later.

All through the early part of the year there was much complaint of the scarcity of the grades of Territory wool most wanted. Fine and fine medium wools were quoted at this time on the clean basis of $1 to $1.15, and quarter-blood staple at 90 cents. Fine staple and half-blood grades were hardly quotable at this time, but about March 1 were quoted to show a clean cost of $1.30 to $1.35. During the first week in March there was a large turnover of three-eighths-blood and quarter-blood wools, with moderate advances being established all along the line. The market was at the low ebb in March, as far as Territory wools were concerned, the next happening in the local market being in April when large transfers of early contracts were made to a leading mill interest, several million pounds changing hands in this way, it is said, at a substantial profit for the original buyers.

The new Territory wools came forward very slowly from the West owing to the late and delayed shearing, as well as traffic difficulties, which prevented the free movement of wool as well as other commodities. When it did get here, the market was so overshadowed by the larger happenings,

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Government buying, etc., that less attention than usual was attracted to the fact. Scoured values at the opening of the new season were approximately $1.60 to $1.70 for fine staple Territory, $1.50 to $1.60 for half-blood staple, $1.35 to $1.40 for three-eighths-blood staple, $1.15 to $1.20 for quarter-blood staple, $1.50 to $1.60 for fine clothing, $1.45 to $1.55 for fine medium clothing, $1.60 for twelve-months' Texas and $1.35 for eight-months' Texas.

Some contracting was done early in Texas on the basis of 40 cents for twelve-months' wool, the clean landed cost here being estimated at $1.15 to $1.25. The first public sale was held at San Angelo, May 31, and unexpectedly high prices were realized, 700,000 to 800,000 pounds being taken by Eastern buyers at 53 to 58 cents for twelve-months' and 47 cents for eight-months'. At the Kerrville sale, June 21, 1,200,000 pounds went to Boston parties, at better than 60 cents for the twelve-months' and 52 to 53 cents for the eight-months'. There have been no salient features in the local handling of the Texas wools, offerings being steadily taken at the advancing values seen all through the market. Fall Texas wools were opened Nov. 20, by a sealed-bid sale at Kerrville, the price paid being private, but understood to have been 54 cents.

GREAT YEAR IN FLEECES

As regards values here and in the country, 1917 must be considered to have been a banner year in fleeces. Certainly this is true as to profits for both grower and dealer, as very high prices have ruled most of the time, fleeces having ridden on the crest of each successive wave of price advances noted during the year. Dealers say that their purchases in Ohio this year opened at 40 cents and closed at 75 cents, and perhaps this simple statement may well be taken as a fair guide to the whole situation. With Ohio fine washed delaine quoted at 52 to 53 cents at the beginning of the year, it was noted that new high records had been established, yet by the end of 1917 the same grade was selling at 82 to 85 cents.

For most of the time during the first half of the year, the attention of the trade was mainly attracted to fleeces on account of the firmness developed by holders of the remainder of the old clip. Shrewd buyers were picking such wools up steadily, seeking to secure concessions when possible, but paying what was asked when they had to. Each week saw a little more added to previous quotations, so that the statement that the sales of the week had been made at new record figures became a stereotyped expression. Some tentative buying was noted in the Ohio and Indiana fleece wool sections early in April, but nothing of moment was done until the latter part of the month.

At the opening of the season as low as 40 cents was paid for a few clips, but this price held for only a few days, going prices as soon as the season was well started being 50 cents for medium and 45 cents for fine clips. In Ohio and Michigan, as well as in Indiana and Kentucky, country markets developed steadily on ever higher levels, though buyers were slow to accept the situation, and frequently withdrew from buying, and as frequently got back into the game again. Top prices were reached late in June, and though the growers were forced to modify their demands a little, 75 cents appears to have been about the going price at the close.

In this market fleeces have been very strong, practically leading the market on the upward swing. At the end of the year, remaining stocks are in few and strong hands, and no weakness is perceptible. There was a little recession in the asking prices of medium fleeces in October and early November, but the lost ground, if any, was recovered later. Just what effect the importation of Australian wool of the better grades may have upon fleeces remains to be seen. Certainly nothing serious has yet appeared.

GREAT ACTIVITY IN SCOURED WOOLS

Scoured wools have attracted more attention than for many years. Both foreign and domestic scoureds have been moved in tremendous volume, though for a part of the time the trade was greatly hampered by the inadequacy of the local scouring plants to turn out the wool as fast as wanted. In May the plants were reported to be swamped by the business offered, and some of them were so far behind with their orders that they were obliged to announce that they would be unable to book any more business until August. Large sales of wool are reported to have been made while the wool was still at the scourers, small samples being shown and sales made therefrom. This congestion continued through the year and only at the end are the scourers able to see their way through the pile of wool with which they have been overwhelmed.

But this was only one of the points developed. Speculation was often rampant and scoured wools of various kinds appear to have been the favorites for the speculative element in the trade. Early in the year something was done in scoured Territories, choice fine being quoted at 90 to 95 cents, average fine at 85 to 90 cents and fine medium at 80 to 85 cents. By the end of May, Territory scoureds were very scarce, though at that time some small lots of choice fine white wool were offered at $1.60 to $1.65. From this time on, and especially in the marketing of the new clip, dealers found little inducement to scour their Territory wools, as they were able to sell a large proportion of their holdings from the new clip in the original bags, or at least in the grease after grading.

When in February, 1915, pulled B supers sold at 70 cents, this was considered a wonderful price, though the market did not stay there long, and heavy losses were made in the subsequent decline. Yet late that year there was a substantial recovery so that Eastern B supers sold at 75 to 80 cents at the beginning of 1917, and Western B supers at 78 to 82 cents. These grades are typical of the whole market for pulled wools, similar advances being registered on other grades. There was considerable speculation in pulled wools through most of the first half of the year, with periods of excitement and great activity. Prices advanced steadily until the end of June, when Eastern Bs were quoted at $1.35 to $1.40, or nearly double the top price reached at the time of the boom in 1915. At the same time Western Bs were quoted at $1.25 to $1.30. New lambs' B supers opened at about $1.35 clean, compared with 65 to 67 cents in the previous July.

The big killing, however, was made in foreign scoureds, mainly South American and Cape wools, as Australians were out of stock. Periods of wild speculation marked the progress of the market, with the same lot of wool changing hands several times in the same day, without being moved out of the original loft where it was stored. It was not unusual for a dealer to sell a lot of wool only to buy it back later at a much higher figure, after it had been bought and sold a number of times; and when inquiry was made as to its location to be told that it had never been moved from his own loft.

Naturally the concentration of Government demand upon medium wools and crossbreds caused unusual interest in such wools, and this interest was maintained until the end. Efforts have been made from time to time to curb speculation, notably by the Committee on Wool Supply about the first of November. For a time this seemed to have a restraining effect, though renewed buying was reported later. All foreign scoureds have fully kept pace with the great advances in values that have been recorded from time to time in other grades. Second clip and South American lambs' have been especially active, with a big advance late in the year, the market closing very strong for all low wools.

In accordance with the vote of the wool trade at the meeting of Dec. 3, and following the announcement of the new import regulations on Dec. 15, the Committee of Thirteen requested President Koshland to appoint the committee authorized at the annual meeting of the Boston Wool Trade Association. Immediate action was taken and the following committee announced under date of Dec. 15: Louis Baer, of Eisemann Bros.; Albert W. Elliott, of Jeremiah Williams & Co., Frank W. Hallowell, of Hallowell, Jones & Donald, Abraham Koshland, of J. Koshland & Co., Edward R. Peirce, of Crimmins & Peirce, Robert L. Studley, of Studley & Emery, and John Wilcock. Later a meeting of the smaller houses in the trade was held, where the feeling was voiced that they were not properly represented on the committee, and it was voted to present a list of five names to President Koshland and ask that he select two names from the list to be added to the seven previously appointed. This resulted in the names of Charles F. Cross, of C. F. Cross & Co., and Walter P. Wright, of Wright Bros.

This committee is to represent the wool trade in the negotiations that are likely to follow the various moves of the Government in the effort to control prices of wool here and abroad, and to curb speculation in the grades needed for Army contracts. Whether this committee will also serve in the matter of determining the prices to be paid by the Government in case of the exercise of any of the options guaranteed under the new import regulations, is not yet clear. However, there promises to be serious problems enough during the coming months to test to the utmost the ability and business sagacity of every member of the trade. There never was a time when good team-work was more needed than at present, and to the credit of the wool houses it must be said that this is fully recognized and being acted upon.

That the members of the wool trade are keenly aware that they are facing a serious crisis can not be denied. Whether the Government will go so far as to put the trade out of business, as was done in England, remains to be seen. Reports from Washington are not reassuring, inasmuch as they do not indicate continuity of action or that consistency which is as much a jewel in the commercial world as elsewhere. Some wool men are finding a sort of comfort in the fact that if their profits are reduced they will not be called upon to pay a heavy excess profits tax, but this is a narrow way to look at the matter. Others point to the way the wool trade "came back" after the dull period which followed the removal of the tariff on wool as evidence of its inherent strength and buoyancy. Therefore while the outlook is not particularly alluring, and it may easily happen that 1918 will be a year of great difficulty, there is a strong feeling of optimism abroad and an earnest resolve to continue the high patriotism that has distinguished the wool trade for the past year.

Record-Breaking Prices in Carpet Wool

High Level Reached as Result of Unprecedented Conditions Here and Abroad

UNPRECEDENTED conditions extending to all branches of the business have served to make the year 1917 unique in the annals of the carpet wool trade. Record-breaking prices, the rise in silver, increased rates of exchange and insurance, limitation of supply, and the situation with respect to the carpet manufacturers, have combined to make the twelve-months just concluded a period never to be forgotten by factors in the trade. Predictions made during the previous year that prices would reach unheard-of heights were realized as the result of conditions occasioned by the world war. General grades of wool, formerly in great demand, ceased to be factors in the market owing to practically prohibitive prices. Shipping difficulties increased with the progress of Germany's unrestricted submarine campaign and resulted in a considerable reduction in supply. The beginning of the year witnessed but slight change in prices which for some time remained practically identical with those prevailing at the close of 1916. A strong upward tendency was noted and the fact was marked that such changes as did take place were in the nature of increases in practically each and every instance. This led to the universal belief that general increases would be in order before much time had elapsed and subsequent events proved the correctness of this surmise.

Considerable uncertainty was felt by manufacturers regarding operations for the carpet season which began in May. The semi-annual auction which is usually regarded as a determining factor with respect to prices did not come up to the expectations of the members of the manufacturing trade. Considerable stock was withdrawn and subsequent events in the trade served to create a condition which is reported as having a somewhat jarring effect upon the carpet trade. Shortly after this several mills shut down, while a number of others curtailed their production to a marked extent. This state of affairs had an immediate effect upon the buying of carpet wool. Very little was purchased and this lack of demand served to prevent a rise in prices which up to that time had been steadily increasing.

RECORD PRICES PREVAIL

The depression occasioned by the events previously enumerated continued for several weeks. At the end of this period the mills resumed activity, the majority of them operating on a 50 per cent. basis of production. This served as a stimulus to buying and with the increased demand for stock prices began to increase steadily, until during the month of July the high-water mark was attained. Shortly after this the carpet manufacturers began to face a rapidly lessening demand for their product and in order to keep their organizations intact many mills began to enter the field of manufacturing for

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tne Government. A considerable percentage of looms were given over to the manufacture of cotton duck and blankets while many mills began to produce knitting and sweater yarns. Inasmuch as the larger manufacturers had purchased heavily at the beginning of the year they found themselves in possession of stocks calculated to last over an eight month period, providing the demand for carpets did not increase. As the result of this condition, the larger operators found it unnecessary to purchase carpet wool. The smaller manufacturers, who had not provided for themselves against the future, were obliged to purchase wherever and whenever possible. Owing to the fact that production had been curtailed to a degree these purchases were easily taken care of by the dealers in carpet wools.

DEMAND FOR BETTER QUALITIES

With the entrance of the United States in the world war there arose a demand on the part of the Government for blankets and overcoats for the equipping of the troops. Shortly after this a considerable demand was manifested for better grades of carpet wools for better than carpet purposes. Sales in these grades increased and the business was carried on principally with dealers. As buying increased and stocks diminished there was a marked tendency on the part of buyers to be satisfied with slightly lower grades of wool. Prices, which had fallen off somewhat after the heights attained in July, began to stiffen until in October they had returned to a level almost as high as that attained three months previously. At the present writing the principal demand in the market is for the better quality wools, although the tendency to be satisfied with slightly lower grades is still manifest.

RISE IN SILVER

Comparative scarcity in many lines has been apparent since the beginning of the year. The principal amount of trading has taken place in China wools and these have maintained a high price level throughout the year. Had ordinary conditions obtained there is a probability that these would have eventually decreased in price. As a matter of fact at the time when such a recession was expected the price of silver rose rapidly. Inasmuch as China is on a silver basis and the Chinese tael usually quoted at 70 cents had risen to $1.15, orders from China became possible only at higher rates. As the result of this dealers in carpet wools found it difficult to consummate business on forward shipment. Internal conditions in China and the high prices at which consignors there held their wool also served to keep prices high. These derived additional strength from the fact that freight and insurance rates had mounted. The shortage of supply occasioned by poor transportation facilities served to maintain the high level.

CAPES UNSOUGHT

Low native capes which in 1916 had proven popular with carpet manufacturers, did well at the beginning of the year, but eventually increased in price until they were beyond the reach of manufacturers. The same condition of affairs prevailed in the case of Cordova wools. Macedonian wools which also sold well during the early months of 1917 increased until they were no longer available. East Indias could not be obtained while shipments of Russian wools were few and far between.

British Wool Trade in 1917

Trade Entirely Under State Control—With Principle Vitally Necessary

(By Our Regular Correspondent)

BRADFORD, ENGLAND, Dec. 15.

EVERYTHING which has happened of any real importance during the year has had more or less bearing upon State Control. This has been the dominating influence throughout the whole year.

THE LONDON SALES

So little has been heard about these recently that they have almost been forgotten, but it was only last May that the last distribution sale was held in London. The first sale of 1917 commenced on Jan. 4. These were really the December, 1916, series which had been postponed. About 81,000 bales were available, the greater part of the offering being merinos. A rumor was circulated to the effect that no reports of the sale would be allowed, and the information about them was certainly more meager than would have been the case if the Government had had no interest in them. Competition at the opening was good and there was no change in price for any good merino and crossbred wools. Some irregularity was seen in faulty merinos. The progress of the auctions showed that there was not the same measure of confidence in values as was seen in December. There was an increasing supply of merino wool and this, along with the influence of Government control tended to depreciate values for this description. The larger part of the buying was against contracts previously booked, a spirit of caution being in evidence, simply because of the prospect of less raw material being allowed to go into consumption for civilian purposes. Even compared with opening values faulty sorts became easier and extreme prices for crossbreds were less in evidence. At the close of the series all values were lower. The call for good topmaking wools was fairly good right to the end, but prices during the last few days were not equal to those realized at the beginning.

THE SECOND SALE

The second series of 1917 commenced on Feb. 13. Another change was made in selling arrangements. In January, wool owned by the Government was offered in the same catalogue as privately owned wools. Those who were buying on Government account were instructed to select what they wanted, and such lots were then withdrawn from the catalogue and sent direct to the user. In February Government wool was offered on five different occasions at intervals throughout the three weeks' series. The first sale was unsatisfactory from a crossbred buyer's point of view. The entire offerings were small, not more than 6,000 bales being catalogued and 1,300 were withdrawn. Prices were well maintained on the basis seen in January, though bidding was restricted to a small number of buyers. One characteristic of the first day's sale was the large withdrawals of greasy merino wool. Full market prices were bid, in some instances more than January. The reason for such wools as commanded good bids not being actually sold, was the high limits placed upon them by the Government. Many lots were withdrawn with a margin of 1½d. to 2d. per lb. between the limit placed on them and the actual prices offered. This was the situation at the close of the first week of the sales, and during the second period merino wools showed an advance of about 10 per cent compared with January prices. The offerings were very scrappy on most days, the best being those put up on Government account. No improvement was seen in the offerings of crossbreds, New Zealand wools and the greater part of Australian of this description having been withdrawn for military purposes.

During the last week of the sales further advances took place in both greasy and scoured offerings. It was obvious that the Army Contracts Department was offering no cheap wool, for some well-known marks made exceedingly good prices, realizing as much as 42d. per lb. in the grease. Though this price was high, it was only just equal to the Government limit, and it may be commented that the clip which realized this price was not considered to be as fine in the staple as in previous years. During the closing week more wools were withdrawn on Government account, and had it not been for this fact there would have been an excellent show of scoured merinos. Previously slipe and scoured crossbreds had been withheld, and the keeping back of merinos was a new departure. Australian crossbreds of 50s quality and upwards were also dealt with in the same way, which tended to make the sales of much less interest to crossbred buyers generally. Summarizing the February series it may be said that all values were higher compared with the close of the previous series, with the exception of greasy combing South African wools, only the very best light-conditioned of this class selling on a parity with previous rates. Heavy combing grease was ½d. to 2d. per lb. cheaper. All Australian wools, except such as were not quotable, were decidedly dearer. The advance in scoured merinos for average to good sorts was in some cases as much as 7d. per lb. Good greasy merinos were 2d. dearer. Scoured and sliped crossbreds were unquotable.

THE THIRD SERIES

The March series was largely a repetition of what happened in February. The first day's sale revealed steady prices on the whole, though some offerings suggested that prices were slightly easier. Greasy merino wools were fully equal to the previous sales' rates, scoureds being generally somewhat dearer. Government withdrawals again interfered with buying, practically no crossbreds being offered. This resulted in a dragging element in the bidding. Under ordinary conditions some interest used to be taken in American buying in London, and during the last week of the auctions in question, on three separate days when only Government wool was offered American competition was allowed. Some disappointment was felt respecting the result, for the opportunity thus afforded was not turned to much advantage. The selection on one of the days was exceedingly good, but the greater part of the wool offered was taken by home trade spinners and manufacturers, large weights being also bought for Italy. Ten thousand bales were promised for America, and buyers were asked to say whether it was intended for that destination or not. This was to avoid more than the prescribed quantity being taken. No more than 5,000 bales were taken for the States.

Some talk was heard in Bradford trade circles to the effect that the system of wool selling adopted in Liverpool would also be put into operation at the London sales. As a matter of fact this method was tried at the London low wool sales which were held before the Colonial series ended. The Liverpool system was for intending buyers to signify what they wanted by a show of hands, the wools being apportioned accordingly.

The only other occasion on which there has been a public distribution of wool in London was on May 24, when about 18,000 bales of New Zealand wool was disposed of. Prices were fixed, being printed in the catalogues along with the description of the wool itself. The attendance on this occasion was fairly good. The wools were on show three days before the sale to enable buyers to form their opinion about the offerings before actually purchasing. The demand for crossbreds would probably have been greater but for the fact that the authorities had complete control of private stocks. Some firms had put in large stock against civilian orders, but it was known that after June 15 they could not use them, that after that date anything held would be taken for military use, and would not be allowed to be consumed for civilian purposes.

INITIAL CONCEPTION OF STATE CONTROL

As mentioned, State Control has been the dominating influence throughout the whole of the year. At the end of March a meeting was held in Bradford attended by the Assistant Director of Army Contracts, who presided, whilst the Controller of wool supplies was also present, along with many other Departmental officials. The purpose of the meeting was to set forth the Government programme. There were several things the trade wanted to know, among which were what supplies of wool would be available, the price at which they could be had, and the conditions of purchase. The Department had realized the importance of adequate wool supplies, and because of this had been compelled to take control of them, as well as transport, labor and machinery. Already much of the latter was on Government work and it was announced that the intention of the Department was that the remainder should be run mainly on export trade.

Notice had been given to the Department by the Admiralty that wool shipments would be spread over a longer period than usual, and could not be brought home except in the national interest. It was proposed to distribute raw material to Government contractors by means of samples. These would be on show in Bradford and possibly in other centers. The wools were to be priced according to standard.

For some time dissatisfaction had been expressed with the Advisory Panel, the body constituted to advise the Government on matters relative to the wool trade. A new body was therefore formed with the title of General Advisory Committee whose business it was to consult with the Wool Textile Section of the War Office. The names of the gentlemen selected were on the whole favorably received, though it was felt that the wool and topmaking department might have benefited by the addition of those whose names did not appear. The weak point in connection with the old panel was that it had too little power against actions which were detrimental to the best interests of the trade. The Department undertook to give as much information as possible to the new Committee and to deal carefully with its recommendations. At the same time it was definitely affirmed that those who were not willing to support the Department's plans would receive no consideration. The expressions of dissatisfaction emanating from the trade were no doubt instrumental in rousing London officials. Nobody connected with the wool industry in its practical aspects had any desire to hamper the Department, but it was felt that the trade itself was in a very large measure entitled to the privilege of carrying out the details

of the policy which might be necessarily enforced by the Department.

AFFILIATION OF TOPMAKERS

At the meeting of Government representatives held in Bradford to which reference has already been made it was stated that the Department needed considerable quantities of tops, and that to produce them a large proportion of the sorters and other labor, as well as combing machinery which was available, would be needed. It was decided that topmakers who put wool through on Government account should do so on commission. In order to interfere as little as possible, the Department decided to do this part of its business through large topmakers. Smaller firms were to be affiliated with the large ones, the Government dealing only with the latter. Standard qualities were to be made, and the work apportioned fairly to each firm concerned, in order that all might have comparatively equal remuneration. The number of firms to whom the appelation was given of Government topmaker was 15, each one of these having affiliated with them three or four of the smaller firms. The object of this was to give as much opportunity as possible to men in a small way of business. Each small firm commenced to work under the control of one of the large ones.

An unsettling feature of the market about the time the affiliation of topmakers took place was the absence of a satisfactory standard of values for Government tops. The Government having complete control of wool supplies, and with them also announcing that they would be prepared to sell tops which they could not use themselves at a higher price than that current in the market, tended to make the trade generally feel dissatisfied. As a sort of offset to this it was made known that a new arrangement had been introduced whereby the necessary supply of crossbred tops might be secured. Firms having private stocks were requested to submit samples to the Wool Office with the intention of selling them at the prices fixed by the Department at the beginning of the year.

REGARDING WOOL SUPPLIES

In carrying out the scheme of State Control the authorities have presumably had one vital aim before them. This has been to safeguard supplies of manufacturing material. This being so, the attitude they have taken and the opinions expressed respecting the quantity of wool available, have had not a little to do with the policy they have followed. During practically the whole of the year there have been two distinct camps, one represented by Government officials, being of the opinion that supplies of wool were not adequate for requirements, and the other, comprising members of the trade, being of an exactly opposite opinion. Taking the facts as they are known to-day there are indications that the authorities are not so much concerned about supplies as the amount of tonnage available for carrying them, and this applies both to importation and exportation. Dealing with the matter retrospectively, however, there seems very good reason to regret that the authorities have not been more outspoken when dealing with this question of supplies and matters immediately related thereto. The existence of the submarine menace has long been recognized, but for almost an equally lengthy period its failure has been known, at least by the officials. Before last June it leaked out that the percentage of wool losses was very small indeed, and down to the present time there has been no increase or very little in the proportion.

The fact that there have been losses at all, along with even a remote possibility of more wool being sent to the bottom of the sea, whilst in course of shipment from the various ports in the Colonies and elsewhere, soon made necessary a system of control which had anything but a pleasant effect upon those having machinery, and this is saying nothing about purely merchandizing interests. On May 21 an order was issued by the Army Council shortly supplemented by another, making it clear that after June 11 the use of merino tops would not be permissible, except under specified conditions, and that the manufacture of crossbred tops would also come under control on July 2. The issuing of this order placed the trade generally in a most anomolous position, for it went directly in the face of a previous order to the effect that dealings in both crossbred and merino tops would be allowed to proceed without restriction until the end of July. The second order, if obeyed, meant bringing machinery to a standstill, and very many firms acted on their own initiative by ignoring the order which the Army Council asked them to carry out. This incident from beginning to end is an example of the lack of co-ordination between the various departments of the Government associated with State Wool Control, and also of the inconsistency and lack of regard shown by the actions of Departments individually.

SPINNERS MAKE A PROTEST

One of the outstanding public events of the year has been a meeting held in Bradford under the auspices of the West Riding Spinners' Federation. The object of this meeting was chiefly to consider the allocations made by the West Riding Priority Committee, which had previously been set up with the object of rationing supplies to spinners and manufacturers in the locality. The meeting was called because of the inadequacy of the allotments, leading members of the trade being of the opinion that the curtailment of working hours and production involved was altogether unnecessary. The Priority Scheme had been working anything but satisfactorily, as will be easily understood when it is stated that permits were being issued which were intended for a period half of which had already passed. The holding of the meeting mentioned was the first step in a chain of events which ultimately resulted in most desirable reforms being introduced.

COURSE OF PRICES FOR ENGLISH WOOLS DURING 1917

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Lincoln hogs	22	23½	25	25	25	25	25	25	25	25	25	25½
Lincoln wethers	22	23½	25	25	25	25	25	25	25	25	25	25
Nottingham hogs	22	23½	25	25	25	25	25	25	25	25	25	26
Nottingham wethers	22	23½	25	25	25	25	25	25	25	25	25	25½
Leicester hogs	22	23½	25	25	25	25	25	25	25	25	25	26
Leicester wethers	22	23½	25	25	25	25	25	25	25	25	25	25½
Yorkshire hogs	22	23½	25½	25	25	25	25	25	25	25	25	25½
Yorkshire wethers	22	23½	25½	25	25	25	25	25	25	25	25	25
North hogs, fine	25	26	27½	27½	27½	27½	29	29	29	29	29	30
North wethers	24½	25½	27½	27½	27½	27½	28	28	28	28	28	29
Irish hogs, super	24	24	27	27	27	27	29	29	29	29	29	30½
Irish wethers, super	24	24	27	27	27	27	29	29	29	29	29	30½
Irish hogs, selected	23	23	26	26	26	26	27½	27½	27½	27½	27½	29
Irish wethers, selected	23	23	26	26	26	26	27½	27½	27½	27½	27½	28½
Kent hogs, selected	25	25	27½	27½	27½	27½	29	29	29	29	29	30
Kent wethers, selected	24½	25	27	27	27	27	28	28	28	28	28	29
Half-bred hogs, Midland Counties	24½	24½	27	27	27	27	28	28	28	28	28	29
Half-bred wethers, Midland Counties	24½	24½	27	27	27	27	28	28	28	28	28	28½
Norfolk half-bred hogs	25	25	27½	27½	27½	27½	27½	27½	27½	27½	27½	28½
Norfolk half-bred wethers	25	25	27½	27½	27½	27½	27½	27½	27½	27½	27½	28½
Pick Shropshire hogs	27	26½	29	29	29	29	31	31	31	31	31	33
Pick Shropshire wethers	27	26½	29	29	29	29	31	31	31	31	31	33
Southdown hogs	28	27½	30	30	30	30	32	32	32	32	32	34½
Southdown ewes	27½	27½	30	30	30	30	33	33	33	33	33	34½
Cheviot hogs, super	25	25	28	28	28	28	31	31	31	31	31	33½
Cheviot wethers, super	25	25	28	28	28	28	30½	30½	30½	30½	30½	32½
Best Scotch cross hogs	20	21	22	22	22	22	23	23	23	23	23	24
Best Scotch cross wethers	20	21	22	22	22	22	23	23	23	23	23	24
Welsh fleeces, fine	21	21	23	23	23	23	24	24	24	24	24	25½
Welsh fleeces, deep	19½	19½	21	21	21	21	21½	21½	21½	21½	21½	23
Radnors, fine	23	23	24	24	24	24	26	26	26	26	26	29½
Radnors, deep	20	20	22	22	22	22	24	24	24	24	24	26½
Scotch blackfaced ewes and wethers	16	16	17	17	17	17	17	17	17	17	17	17
Herwick ewes and wethers	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½

After the 28th of February prices for English wool were entirely controlled by the Government, and therefore the above schedule has been prepared in harmony with that fact. The prices given may be regarded as approximate.

International Substitute Trade Small

Government's Demand and Control Have Affected English Conditions

DEWSBURY, ENG., Dec. 4, 1917.

IN reviewing the general trade of the heavy woolen district of Great Britain for the year 1917 one is bound to admit that there have arisen many matters that were unexpected, owing to the fact that the war has been prolonged far beyond what was expected. And as it has continued new and unlooked-for developments have arisen and have had to be dealt with in a careful and business-like way. Slowly but surely demands for all kinds of woolen material for war purposes have had to be met, until to-day it is a well-known fact that fully 80 per cent of the mills are engaged in the manufacture of cloth, flannels or blankets and for all services of the Allies. Owing to this fact there has been a steady encroachment upon the machinery engaged in the production of cloth, both for domestic and oversea markets. Quite recently a further development has taken place in the fact that the authorities have insisted upon certain mills abandoning altogether their production for civilian purposes and have instructed them to produce cloths suitable for the discharged soldiers. In this direction arrangements are now fixed; any stock on hand has been taken over and will be served out to the men as required. Still it can safely be said that so far there has not been any shortage for the man in the street; the only complaint one has heard has been regarding the price that has had to be paid, a fact inevitable under the circumstances.

ADDITIONAL GOVERNMENT ACTIVITIES

Many other Government developments have taken place, the handling and rationing of wool for all purposes, military or civilian; the control of all kinds of waste and, what has been a big task, the control of all kinds of clips from the army and navy clothing stores, also cast off garments, all of which are being rationed out and utilized for remanufacture, until to-day the Government is handling by far the major portion of clips and woolen rags produced in this country, thereby saving the country a large sum of money and assisting in the production of khaki and other goods required for the services. Not only this but now the authorities are well on their way with the scheme for producing standard cloth and before long suits and overcoats will be on the market at a reasonable price for the middle and working classes, the Government providing the wool necessary out of their reserve stocks.

MILLS RUNNING FULL

All the year our local mills have been worked to their full capacity day and night, as far as labor was available, and the workers have shared in whatever prosperity there has been, for they have had two advances in wages amounting in all to about 50 per cent over pre-war rates. It must be admitted that employers and workpeople alike have done their best to stimulate production and help on the war.

Civilian cloths that have been produced during the year have been limited, both in variety and shades. They include tweeds and a few serges of sombre shades for men's wear, but for women's trade there has been far more variety, and a finer grade of material has been put on the market. The development of this particular trade has been a marked feature during the present year. Fine pure wool dress goods that were on the market prior to the war, have, owing to the demand for fine wool for war purposes, practically disappeared and imitation cloths have taken their place. Women who have been earning such good wages in various employments have had more spare cash than was the case formerly and have not been satisfied with the old style tweed costume cloth but have demanded a more stylish material and one that had more variety. A start was made towards the end of last year to produce a material from a fine grade shoddy mixed with a fine noil, very much after the style of what has been produced in various parts of the continent during the last ten years or so. Owing to the fact that a large variety of natural color and shaded substitutes was on the market, quite a fashionable article has been produced and has met with a ready sale. Probably after the war this particular grade of goods will be developed to the benefit of all concerned.

GOVERNMENT ORDERS LARGE

As we approached the fall of the year and it was anticipated that the war would not end during 1917 the authorities commenced to place orders for blankets, and in many varieties, best, medium and low grade qualities, down to the cotton warp materials, wanted for various purposes. As a natural consequence the production of civilian goods was reduced. This is likely to continue, judging from the present outlook, for some months to come. Meanwhile the manufacture of khaki has not diminished, but is as great as ever.

The export trade during the year has gradually dwindled until to-day for various reasons it is about as small as the domestic trade. All the year merchants have been pressing for delivery and our colonies and a few neutrals have had to be satisfied with very limited quantities. Our Allies have had to be supplied as far as possible, especially France, whose chief woolen trade centres have been in the hands of the enemy for over three years. Certain foreign markets are willing to

(*Continued on page 322*)

Knit Goods

Ok'd by its Users

IF you want to know the real, practical, working value of the Tandem Interlock Machine, write to those manufacturers who have used it for many years—under exactly the same conditions that exist in your own plant.

We'll gladly give you as many names as you want—and what they say will convince you that you can't buy another machine anywhere **at any price,** that can fill the place of the Tandem Interlock.

The Tandem Interlock makes a smooth, flat, elastic seam that cannot irritate the skin, and that gives with every motion of the body. That's why it is known as "The Machine That Took The Itch Out Of Stitch"—and the secret of its popularity with high grade garment manufacturers.

It seams and covers seams at one operation—at a remarkable saving of time, labor, and expense.

Write for samples of the work it does.

Find out, **now,** about the possibilities of the Tandem Interlock for your plant.

Look for the "Double Locked" trade mark, and the name "Union Special." They are your protection.

UNION SPECIAL MACHINE CO.
300 W. KINZIE STREET, CHICAGO

The Best Foundation for Stylish Clothes

PERFECT FITTING **MUNSING WEAR** UNION SUITS

Let Munsingwear cover you with satisfaction

The Quality of All the 75 Different Munsingwear Fabrics Fully Maintained

YOU will find in Munsingwear in 1918 the same fine quality, the same perfection of fit and finish, the same durability and washability, the same exceptional comfort and value, as in previous seasons. Prices are, of necessity, higher than formerly. But the quality of each and every Munsingwear fabric is fully maintained. Purchase Munsingwear if you want the utmost in union suit satisfaction and service.

Whether you are tall or short, fat or slim, there is a "right" Munsingwear size for you. Every garment is sanitary,—"Fit to wear next the skin." The mill where Munsingwear is made is one of the largest of its kind in this country and is regarded by experts as the "last word" in modern mill construction and efficiency.

The Home of Munsingwear Minneapolis, Minn.

Over 30,000 Munsingwear garments produced daily

The Northwestern Knitting Co., Minneapolis, Minnesota

MUNSINGWEAR SERVICE STATION, 334 FOURTH AVENUE, NEW YORK CITY

Don't Say Underwear—Say Munsingwear

THE PIQUA HOSIERY Co. P-Q-A
P-Q-A TRADE MARK REG.
UNION SUITS
OF
QUALITY & COMFORT
MADE IN PIQUA, OHIO, U.S.A.
SIZE 40

P. Q. A. Increases Its Service

WITH the recent addition of a branch mill at Bowling Green, Ohio, and increased production at Piqua—we now have the machinery and full facilities to take care of deliveries on men's P. Q. A. Union Suits during the entire year.

Production at Piqua mill includes a line produced on the finest gauge spring needle machines in use, for the finest cotton, lisle and mercerized goods.

Medium fine spring needle machines producing the finest light-weight worsteds.

Correct gauge spring needle machines for knitting heavy-weight worsteds and cotton goods.

Proper gauges of latch needle machines for medium and heavy-weight worsteds and cotton goods.

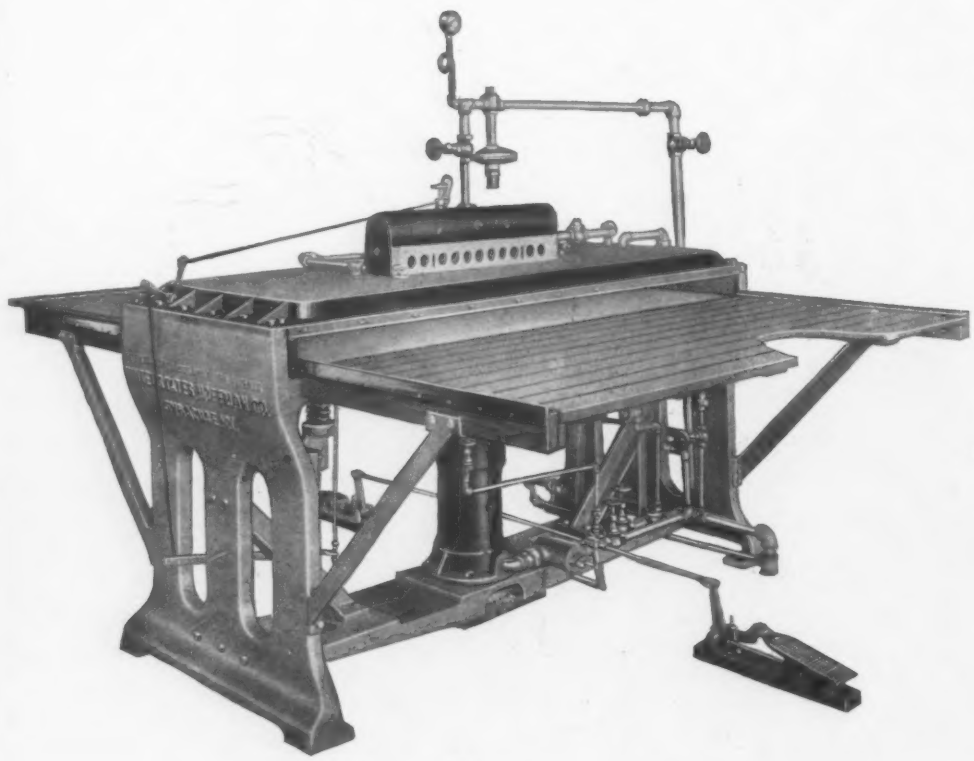
At our Bowling Green branch production is on fine gauge latch needle machines for light-weight cotton goods which have a ready sale the year 'round.

The P. Q. A. Label is a sign of service as well as quality

THE PIQUA HOSIERY CO.
PIQUA, OHIO

Makers of Piqua's first and best Union Suits

UNDERWEAR



SPEED

In these days of high pitch production or in the normal periods to come Hoffman Underwear Pressing Machinery is bound to exceed in speed and capacity.

Light, fast sliding garment conveyors upon which any sort of a mill-hand just merely has to spread or stack two-piece or union suits is one essential promoter of speed.

Another is that hot dry steam is applied from top pressing surface, thereby reaching goods so quickly and penetrating the mesh so thoroughly that the load is finished in a record breaking space of time.

The only human energy engaged is that of loading, unloading and slipping into pressing position the "feather weight" garment conveyors. The machine itself displaces human effort. It punctuates with perfect mechanical precision each of its own operations.

IMPROVED FFF STANDARD

AFTER PRESSING GARMENT IS FIRM, DRY AND LOFTY

THE UNITED S

HAVE UPHELD THE

UNITED STATES

"Beware of Infrin

UNITED STATES HOFF-MAN MACHINERY CO.
with which are merged
UNITED STATES HOFFMAN CO. & T. D. PALMER CO.
FACTORIES: SYRACUSE AND UTICA, N. Y.
OFFICES: SYRACUSE, NEW YORK, CHICAGO, SAN FRANCISCO
REPRESENTED IN ALL FOREIGN COUNTRIES

WRITE FOR CAPACITY DATA

PRESSING

FINISH

From the very first day that Hoffman Underwear Presses went into use, finish of the garment has been steadily improved.

It is, in fact, always uniform without former attendant, liability of rib mashing or button breakage. Seconds are unheard of now.

The *Automatic Attachment* as part of latest model is so constructed as to absolutely control and govern time of pressure and quantity of steam to be applied. This timer is set for a specific performance and cannot be tampered with by an operator of machine. It is guaranteed assurance of balanced daily production. Yes, it's more than that. It's *insurance* to mill owners that day in and day out, year in and year out, complete dependence can be placed upon this equipment to produce full quota of all goods sold—*right on the minute.*

TATES COURTS

PATENTS OF THE

HOFFMAN CO.

gers or Imitators"

AUTOMATIC ATTACHMENT

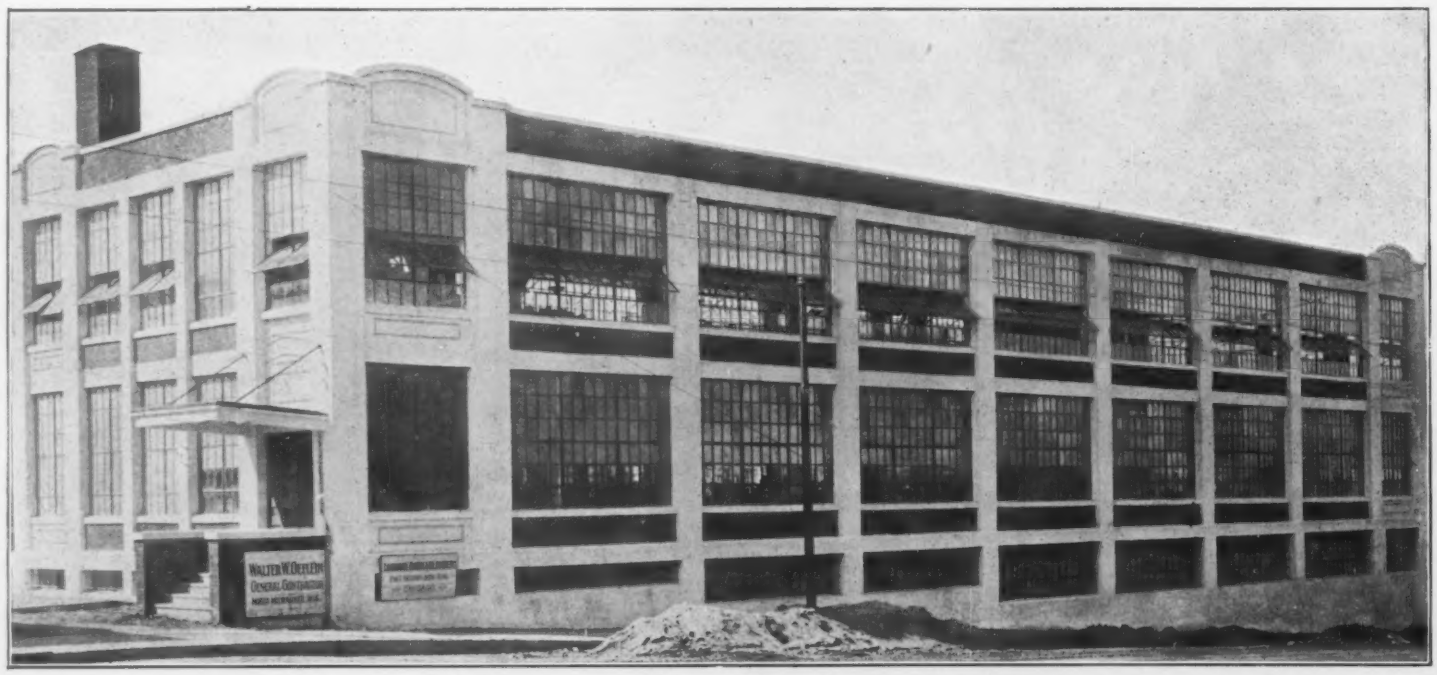
ALL GOODS AUTOMATICALLY STEAMED AND TIMED UNDER PRESSURE AND BY UNSKILLED LABOR

WRITE FOR CAPACITY DATA

UNITED STATES HOFF-MAN MACHINERY CO.
with which are merged
UNITED STATES HOFFMAN CO. & T. D. PALMER CO.
FACTORIES: SYRACUSE AND UTICA, N. Y.
OFFICES: SYRACUSE, NEW YORK, CHICAGO, SAN FRANCISCO
REPRESENTED IN ALL FOREIGN COUNTRIES

Black Cat
Reinforced Hosiery

COOPER'S BENNINGTONS
Spring Needle Underwear



NEW MILL AT SHEBOYGAN, WISCONSIN

With factories located at Kenosha, Wis., and Bennington, Vt., unable to supply demand, it has been necessary to build and equip three new mills this past year. Two mills, one at Sheboygan, Wis., another at Harvard, Ill., will almost double hosiery capacity. The new factory at Bennington will provide an output sufficient to take care of the increased demand for Cooper's-Bennington underwear.

The new buildings are examples of the best type of modern factory construction. Steel, concrete and glass combine solidity with appearance. Rooms are flooded with light; sanitary conditions are ideal.

The health of operators, now numbering well over 2,000, is carefully watched in all plants. Rest rooms are provided and are always open. Nurses are in attendance and medical aid is furnished without charge.

Welfare committee made up of employees plan many social activities. Good entertainments and dances are given at frequent intervals. Attended by the entire Black Cat organization, co-operation and personal interest result.

The present weekly production is 25,000 dozen pairs of Black Cat hosiery and 4,000 dozen of Cooper's-Bennington union suits. Black Cat products are trade-marked and sold direct to the retailer. National distribution is backed by extensive National advertising.

Black Cat Textiles Co.

Kenosha, Wisconsin

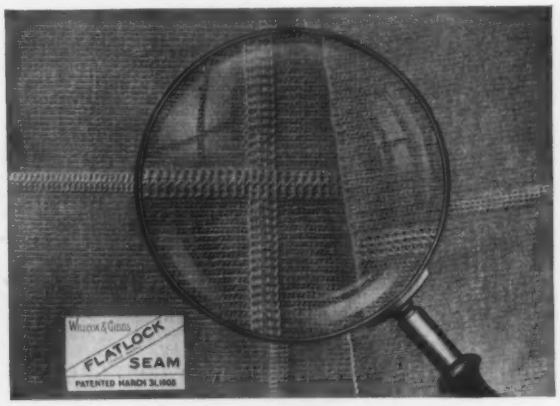
Mills at—
Kenosha and Sheboygan, Wisconsin **Harvard, Illinois** **Bennington, Vermont**

The Seam That Sells the Garment

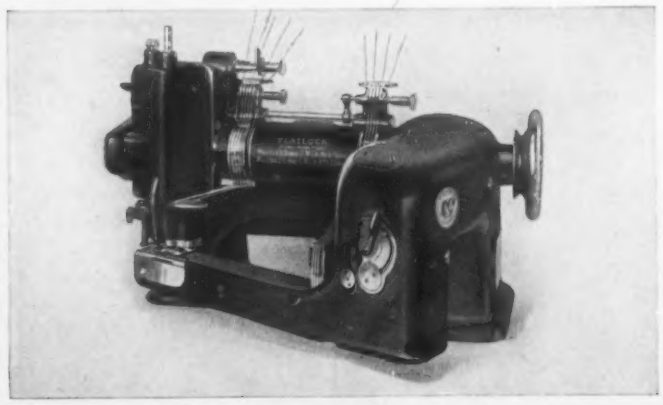
FLATLOCK

REG. U. S. PAT. OFF.

The Trademark



The Seam



The Machine

Trade Mark

Reg. U. S. Pat. Off.

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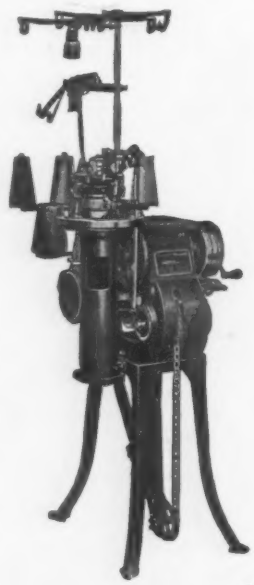

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Knit Goods Surrounded by General Uncertainties

Hosiery Manufacturers Confronted by Many Problems Impossible to Solve

WAR conditions stand out prominently in the hosiery market during the year; in fact, they almost entirely eclipse all other influencing factors. An already feverish market, characterized at the start of the year by the utmost of caution on the part of both buyers and sellers, was thrown into a state bordering on chaos when the severance of diplomatic relations between this country and Germany occurred in February. Up to that time buyers had operated only in a nominal manner and in many instances their purchases were far less than their needs. Prices were high, the fall lines of cotton ranging fully 50 to 75 per cent above those of the same season of the previous year, and despite the advice of selling agents that further advances appeared positive, buyers were not convinced. Then the international crisis coming with only rumblings of a warning, checked all operations. Cotton declined and wool advanced, both changes being radical in nature. Buyers really did not know what to do, and temporarily solved their dilemma by doing nothing.

Chaos existed but a short time; in fact, about a week. It was soon brought to the attention of buyers that this country's participation in the war would mean the entrance of a large buying competitor in the market—the country's demand for hosiery to equip its existing and potential fighting forces. And such a buyer could not be held off by conditions that affect usual business. Deliveries would have to be made, even if commandeering of plants were necessitated. Realizing all this, buyers soon came back to the market, threw off most of their cautionary spirit, and placed orders to the extent permitted by manufacturing conditions. But the opportunity to place business was limited. Cotton had recovered its slump; wool was higher; yarns of all descriptions were scarce and extreme in value; knitting needles were difficult if not almost impossible to secure; and chief of all labor was arrogant. The combinations placed manufacturers in a position where they were not positive whether it was good policy to take on much new business. And to complicate the situation further the Government called for hosiery bids. Manufacturers were unqualifiedly willing to take the latter business, but officials gave no intimation as to what the ultimate volume of war demands would be; hence manufacturers did not want to be largely covered with civilian contracts that would have to give way to Government production.

NEW SELLING METHODS NECESSARY

With conditions in the described state a natural slowing up happened. Buyers were still pressing for stock, but met no important receptive enthusiasm among agents. In fact, the latter strongly advised caution in placing orders, and none of the latter was accepted unless manufacturers were covered by materials on hand or under contract. This gave birth to a new merchandising. Manufacturers who previously sold to capacity for the season, regardless of the amount of raw stock and yarns on hand, abandoned that policy for the conservative acceptance of business based on the owning of stock. Contracts running three to four months only were acceptable and buyers were forced to conform to the change.

From this time up to the actual declaration of war there was a heavy pressure to demand. It soon became evident that jobbers were intent on covering their fall requirements in full, and while naturally there was some opposition to high prices this did not take any concerted form, and in the majority of instances prices were placed secondary to the ability to buy. Half hose was in particularly heavy demand, but for one of those unexplainable vagaries of human nature there was but a listless inquiry for women's hose. Previous reports of a surplus of men's goods were soon proved unfounded, for it was only with extreme difficulty that buyers were able to cover even a portion of their further demands. It was in these lines that knitters were most conservative in the acceptance of new business, for it was realized that Government requirements would be confined to such products. How much wool and how much cotton hosiery would be needed, was the unsolved perplexity that manufacturers faced, and that required the utmost conservatism in taking civilian business.

WOMEN'S LINES LESS AFFECTED

Women's lines, while not directly affected by war requirements, were indirectly controlled by the latter. Material and labor costs continued to mount. Selling figures advanced, and while demand was far less than production there was no break in quotations. Much of the increased production of such lines was brought about by knitters changing their operations from men's to women's lines. The scarcity of skilled help necessary for the looping of men's ribbed tops influenced this, and caused a serious curtailment of men's lines to further disturb an already complicated situation. All through the year the condition remained without important change in women's lines. Production continued larger than supply but prices retained all their strength.

OTHER MERCHANDISING CHANGES

From the severance of diplomatic relations with Germany in February up to the actual declaration of war in April the hosiery market had been gradually adjusting itself to new conditions, so that when this country joined the belligerents there was no radical change in the situation. It did influence, however, changes in merchandising methods that were decidedly opposite to usual practice. Seasonal openings were eliminated, and selling was confined to periods of three to four months. The old bugaboo of cancelations was relegated to the background, and contracts had to be of a bona fide character before accepted. All these changes were given no sudden birth; they were the natural outgrowth of the readjustment of conditions to meet war demands.

Raw material and yarn prices continued upward in tendency, and advance followed advance. Wool, of course, was the steadiest climber, and though cotton hesitated or declined now and then, it generally recovered and passed the previous top level. All the time yarns were advancing in price and growing scarcer in volume. Spinners began conserving in sales to be positioned to care for any Government demands that might develop. This made for an uncertain future for knitters, and a natural result was their refusal to take contracts calling for extended deliveries. Buyers who previously had been able to come into the market and secure plenty of stock at practically their own terms faced conditions hardly believable and never known in the experience of many. Contracts were closely scrutinized and in most instances bared to the bone. Deliveries had to be specified when contracts were placed, and a feeling that selling terms were to lose their old easiness was evident, and later materialized. No longer could buyers place orders in volume alone, and later specify qualities and deliveries.

UNKNOWN GOVERNMENT NEEDS

All through the year knitters were on edge from the lack of definite advices as to what volume of goods the Government would need. The seeming inborn traits of secrecy among Government officials persisted, and the clarifying statement was absent. Now and then bids were called for, and in most instances hosiery men responded in a patriotic manner. Civilian contracts now experienced further embarrassment. Deliveries had either to be cut down or deferred, and in not a few instances buyers were unable to determine when they would get their goods. In general the situation was subordinated to war demands with a minimum of friction. Later, however, some ill-feeling was engendered, and accusations that several manufacturers were playing "dollar patriotism" were heard. Selling agents accustomed to placing orders with several mills were facing conditions that created hardships. Their orders had been accepted, but were now being subjected to severe cuts or entire deferment of delivery. The agents were entirely willing to acquiesce when the Government benefited. It seemed apparent, however, that several manufacturers were taking advantage of the situation, and accepting more profitable Government contracts at the expense of civilian business. Unfortunately, no action was taken to determine the veracity of these claims, and the year closed with the feeling still rankling in the minds of many selling agents. Among the agents having the sole sale of mills, however, there was none of this feeling, for Government orders were placed entirely through the agent and took the place of usual civilian business, with commissions applying as normally.

CONDITIONS PERPLEXING

Early indications of the pinch to come were evident at the time spring openings should normally be made. In a majority of instances knitters were between two fires—demand from buyers on one side and potential Government business on the other. The only practical solution was the acceptance of a minimum of civilian orders and the awaiting of Government action. Buyers were perplexed as well as knitters, but the situation was cheerfully accepted and the slogan of "All for the war" governed the market's progress. Buyers, formerly used to placing orders covering their entire needs for the season, figured what their actual requirements for a few months would be, and knitters took as much of the latter as they could with safety. All the while costs were advancing, but the situation had now reached a stage where prices were really secondary to buying ability. While lines would be priced at the opening, almost invariably they were subject to further increases, for knitters were operating on a basis of stock owned, and the purchase of new supplies of raw stock and yarns meant higher production costs. Added to these difficulties was the unreasonableness of labor's demands. Talk of large profits was rife, and without definite knowledge of its accuracy labor demanded a full share. Wages were advanced to levels out of all proportion with previous payments. Not only was help troublesome in this manner, but emergency wages paid in war industries attracted many employes.

A CO-OPERATIVE COMMITTEE

A situation growing steadily worse was somewhat alleviated in May by the appointment of a knit goods committee by the Council of National Defense, to advise with the latter in the purchase of knit goods. This committee, composed of representative members of the industry, did yeoman service in bringing a semblance of order out of impending chaos. A census of hosiery machinery was provided, manufacturers advised the amount of civilian business booked, and Government orders were apportioned with a minimum of disturbance to regular business. It was unfortunate, however, that this committee could have no positive information as to the volume of the Government's needs. Lacking such knowledge it was manifestly impossible to care for the future, and the trade had to go along with probable Government business over their heads as a check upon the acceptance of any volume of civilian orders. Even to the end of the year this situation existed, and the trade continued into what normally would be a period of fall openings without knowing how much business would have to be diverted from civilian to Government channels. This, of course, made fall openings practically impossible and confined business to the tentative acceptance of comparatively small contracts. In wool lines the situation was severely acute, and up to the closing days of the year no new civilian fall business was known to have been taken. Not alone did it restrict the openings, but brought wool hosiery into a new year fraught with so many uncertainties that business is practically at a standstill.

Radical Changes in Underwear Trade

Uncertainty as to Government's Requirements Perplexes Manufacturers

CONDITIONS never before experienced in underwear developed during the year just closed, and influenced an almost complete reversal of previous practice. All through the year the market was in a tight position, and the passing of each month brought further evidence of well sold mills. Selling terms and periods were revolutionized, and prices advanced to almost unheard-of levels. In short, the whip was taken from the hands of the buyer and given to the seller, yet on the latter's part there was no tendency to crack it unfairly over buyers' heads, and the latter were treated in all fairness.

War, of course, directly and indirectly, was the cause of this upheaval. From the break of diplomatic relations with Germany, in February, underwear manufacturers prepared to subordinate regular business to war demands, for it was inevitable at that time that war must result, and it was naturally expected that our fighting forces would be in large need of underwear. So when war was actually declared and the equipment of troops started, the underwear situation was ready to give full co-operation. Unfortunately, however, manufacturers could learn with no degree of certainty of what volume these requirements would be, and more unfortunate was it that up to the close of the year they were still without this vital information.

BIDS REDUCED

As early as February bids on shirts and drawers were called for, the opening date being March 5, but previous to their opening the amounts of cotton garments were materially reduced and wool garments entirely eliminated. This naturally made for more uncertainty among manufacturers, and placed them in a position where they really did not know what action to take. Co-operation with the Government was uppermost in their minds, yet regular business had to be served. In April the call was made for some 2,000,000 garments, and then the acute scarcity of stocks developed. So large, in proportion to production, had buying been during the previous season that mills were sold almost to their entire capacity. A suggestion of chaos resulted, and different and independent meetings of manufacturers were held for the purpose of bringing at least a semblance of order. Considerable relief was afforded, shortly after the declaration of war, by the appointment of a committee from the trade to co-operate in an advisory capacity with the Council of National Defense in its purchase of knit goods. Through the work of this committee Government business was apportioned among mills in a manner to interfere least with civilian business already contracted. While in a sense the work of this committee was highly efficient its tasks could have been made much easier had it been advised with some degree of certainty as to what volume of goods would be required.

MERCHANDISING CHANGES

So the year progressed from the war standpoint. Manufacturers willing and somewhat eager to co-operate, yet lacking definite information on which to base their course. Naturally this reflected to the discomfort of other lines, and brought about radical changes in merchandising. The period of deliveries was shortened, and production distributed in a manner to cover most equitably the requirements of civilian buyers. Seasonal openings were dispensed with, and in many instances manufacturers simply advised customers when goods would be available and took new business on this basis. Woolen lines were the most severely pinched, and at the close of the year wool lines for the fall 1918 season were unopened and gave no prospect as to when they would be on the market.

COSTS RADICALLY INCREASE

Indirectly war was felt through extreme advances in practically all materials going into underwear, and the scarcity and high price of labor. Cotton kept fluctuating all the year, yet each decline was followed by a recovery to new high levels. Cotton yarns were continually appreciating in value, and becoming increasingly difficult to buy. Wool at the start of the year was high, and its advance was uninterrupted until forebodings of Government intervention, and the voluntary action of wool dealers in July stopped speculation and checked further sharp advances. But with wool yarns there was no check to advancing prices, and each sale by a spinner was invariably followed by a new high level asked. Not only were yarn prices high, but as the year progressed it became increasingly difficult to secure further supplies.

The acuteness of this situation became so marked that underwear manufacturers were forced to rearrange their selling policies. The old method of opening lines and booking capacity business for an entire season was abandoned. Deliveries were limited to a four to six month's period, "open order" refused, and the monthly delivery of an equal portion of the size of the order specified. Selling terms were also changed, and instead of the old easy payments, orders were generally taken on a thirty-day payment basis, with discounts, in several instances, cut to 2 per cent. At first these new practices met with some opposition among buyers, but the latter soon realized the critical condition faced by manufacturers, and this combined with a growing scarcity of stocks influenced them to adopt the new situation. In the closing months of the year manufacturers would accept new business only on a basis of raw stock, and yarns actually on hand or under contract, and few mills were so covered for a period extending over more than four months.

Early in the year it became apparent that prices would advance materially, and many buyers cognizant of this attempted to place business for distant deliveries. Their attempts, however, proved of no avail for such business was too speculative to be attractive to manufacturers. As the different lines became available new high levels were established, with selling prices ranging all the way from 35 to 75 per cent. higher than for the previous year. Women's low-end goods scored advances of 35 to 40 per cent., while balbriggans touched levels 65 to 75 per cent. above 1916 values. It was freely estimated that had any appreciable volume of wool goods been available they would easily have doubled in price over 1916. But after war conditions governed the market prices became a secondary consideration to the ability to buy, and percentage advances meant little in their effect upon general conditions.

THE YEAR'S COURSE

The market's year opened in an unauspicious manner and continued of a routine nature during the first several weeks. Buying during the previous December had been generous, and mills were well covered for the first few months. Early in February the international situation gave evidence of a swiftly approaching crisis and a consequent disturbing effect was felt. Manufacturers were aware that they would be looked to for generous amounts of underwear for the fighting forces, and preparations were soon started to care for emergency demands of the Government. The severance of diplomatic relations was the first real intimation of what was to follow, so when war was actually declared knitters in a sense were ready to cope with the new demands. Early Government business was cared for, but only at a sacrifice of civillian orders.

Spring openings were postponed through concerted action of the knitters' association of New York State, and it was not until July that balbriggans were formally put on the market.

In May women's low-end garments were opened in a small way, and demand was voluminous enough to soon take up all available goods. Opening prices ranged from 35 to 40 per cent. above those on similar lines for 1916. There was continual buying pressure for bals, but conditions were so unsettled that knitters firmly maintained their previous resolve not to open until July 5; in fact, several mills attempted to have openings postponed until September 1, but demands of this character were not numerous enough to bring about concerted action.

When bals were opened prices were fixed at advances over the previous year of 65 to 75 per cent., but this did not deter buyers, and within a few days the market was sold to the extent that knitters were willing to take. Stocks were limited, however, and despite an active demand the total of accepted business was not more than 60 per cent. of that of normal years. There was a large unsatisfied demand, that in the bulk remained unplaced during the balance of the year.

After the spring openings the situation progressed without important incidents until the time of usual fall openings approached. Early buying inquiries indicated that there would be an unusual scramble for stocks when the new heavy-weight lines were ready, and this was later borne out in fact. No attempt was made formally to open wool lines, while the openings of cottons were severely restricted. Late in November the bulk of the limited cotton lines were placed on the market, but manufacturers were taking business only on a four months' delivery basis, and within two or three days buying had exhausted the supply. Prices were materially higher than any previously established, and in several instances quotations were further advanced from opening levels. The latter, however, was not because manufacturers were taking undue advantage of the situation, but because some of them were forced into the yarn market where higher yarn values necessitated advances on underwear. The fall wool lines were not opened in any formal manner, or in a quiet manner so far as could be learned. There were rumors that a few knitters were taking civilian business, but these could not be substantiated, and up to the year's closing day no fall wool lines had reached the market. The scarcity of these lines can be learned from the estimate of men in close association with conditions that Government demands had consumed nearly 70 per cent. of normal production, and that the latter was curtailed nearly 5 per cent. more by the scarcity of labor. But the most disturbing factor was the uncertainty of future Government needs. Civilian deliveries had previously been subjected to severe cuts and delays to give the right of way to war requirements, and knitters were unwilling to book any new business until the Government had been satisfied.

Taken all in all, the year was fraught with perplexities for the manufacturer, and at its close few of these had really been solved. Some progress toward the control of wool prices had been made, and it was natural to assume that this would be reflected in the yarn market. Government direction of railroads, it was hoped, would result in improving deliveries, yet nothing tangible in this respect had developed. But seemingly little or no progress was made toward a solution of labor difficulties, and manufacturers faced the new year with the help problem more bothersome than previously.

Sweaters Well Sold During Year

War Conditions Indirectly Affect Trade with Prices Constantly Advancing

WHILE not so affected by Government requirements as was the underwear market, the sweater market's year has been characterized in large part by the same resultant conditions of war. Uncertainties of the future handicapped all business during the course of the year, and necessitated conservatism on the part of both buyer and seller, though that of the latter was most marked. Responding to outside influences, prices kept steadily mounting and the bulk of duplicate buying in all seasons was done at advances of 10 to 15 per cent from the prices prevailing at initial openings. Wool lines were in the most acute situation all year, but this was due in large part to the trend of wool and wool yarns.

The direct effect of war did not materially disturb the market, particularly when its effect was compared with that on underwear. The Navy was a comparatively large buyer of heavy wool lines, but beyond this there was no heavy taking of stocks for war uses. It was not until rather late in the year that the real effect of Navy purchases was felt. In June this buying started, but made no real impression on stocks, for summer trading had been rather quiet and knitters were in a position to take care of this new customer. Around August, however, the Navy purchases became more apparent and a contract for 1,000,000 sweaters had difficulty in finding takers.

The indirect influences of war were felt in steady increases in raw stock and yarns and the constant decrease of help. The labor shortage was felt more severely in the sweater industry than in almost any other branch of textiles. So acute was the shortage that production was severely interfered with and this backwardness of production continued throughout the year.

There were not the radical changes in selling policies as a result of the war that characterized other knit goods markets, but the steadily advancing raw material and yarn costs made it apparent to manufacturers that they would have to stop booking capacity business for an entire season, and confine sales closely to a basis of supplies on hand. This policy worked somewhat to the hardship of buyers and forced the latter to pay higher prices on duplicate orders than they did on initial business, but they soon realized the acuteness of the situation from the manufacturer's standpoint, and there was no concerted opposition to the new selling practice.

Prices showed a continual upward trend, and when fall lines were opened late in the year they ranged all the way from 45 to 60 per cent above those of the previous year on wool lines. More marked were advances on fiber silk goods, the latter advancing well over 100 per cent; qualities of the latter that previously brought $46 a dozen were freely bought at $96 a dozen. The position of the latter was most acute, however, for war conditions seriously restricted the production of fiber silk and largely diverted the latter from regular trade channels. Combined with this was an active demand for such lines that made advanced prices obtainable with a minimum effort.

SOLD-UP CONDITIONS

The year started with the market in a practically sold-up condition, and through the balance of the twelve

(*Continued on page* 321)

Knit Goods Technical Section

Gloves Worn by Soldiers in France

Particulars of Knitted Article Supplied in Large Quantities to the British Army

By *William Davis, M. A.*

DETAILS of the manufacture of various knitted articles worn by British soldiers in France have been given by the writer in previous issues of TEXTILE WORLD JOURNAL. The army glove, which is the subject of the present article, does not appear as an important or vital part of equipment but nevertheless large quantities are supplied for winter wear and in many exigencies of the campaign are highly appreciated by the troops.

The glove is obviously not suited for operations involving the free use of the hands and fingers as, for example, in using the rifle, but when it is a case of maintaining the heat of the body during long spells in the trenches, or in outpost guard work, the glove plays an important part in keeping the hands warm. It is well known that special efforts should be made to have the extremities of the body, such as the feet and the hands, comfortable, for when this has been achieved it goes a long way toward insuring the complete comfort of the individual.

The glove supplied is of the simplest possible description and is designed to be readily drawn off and on the hands as required. It is made of pure wool spun into stout yarns. Herewith are given particulars of one of the most general styles of glove used, which will show the very practical and effective nature of this kind of article. It is made on the flat knitter, of which it is usual to employ at least two widths, one narrow for the working of the fingers in narrow strips, and the other of wider dimensions so as to accommodate the cuff and hand of the article.

The cuff machine is fitted with cams to make the half and full cardigan stitch and may advantageously be driven by power as the glove tops are uniform in character. The machine for working the fingers is narrow in its trick bed, only a few inches of needles being necessary, and for this part of the work the operator requires to perform fashionings for the fingers, points, etc., by hand. Thus it is not found of decided advantage to use power, as the worker can operate the cam bed at a greater speed than would be possible by power. Owing to the limited width of the machine, it can be operated with comparatively small expenditure of physical energy.

In some cases the use of a third class of machine may be introduced on which the hand portion of the glove may be worked, but more often than not the hand and finger portions are produced on the same machine. One thing that may be said in favor of the hand and the fingers being worked on separate machines is that by this means the factory can be worked on what is known as the team system, where one set of workers specialize on making hands and another set on the production of fingers. The last named has an occupation which calls for a high degree of manual dexterity and the girls intended for these machines are taken for the work as soon as they enter the factory and at as early an age as possible, the ideal period being between 15 and 16 years of age. Even then a careful selection has to be made, for some will never make skilled fingerers no matter how long they are trained in the work.

When there are three sets of operators, one set produces the cuffs of the gloves, these cuffs are next passed on to the "hander," who attaches the hand and makes a suitable opening for the subsequent insertion of the thumb; the hand completed, the first finger is usually attached and fashioned as the stitches for this are already on the needles of the frame. At the next stage the article is passed on to the fingerer, who attaches the remaining three fingers and inserts the thumb in the thumb hole.

WORKING PARTICULARS

The following are details of the production of an article of which enormous quantities have been supplied. It is not stated that all gloves are identical in character, because contracts have had to be made which were suitable to the plant owned by manufacturers, but this article is typical of the general run of such goods. The usual gauge of flat knitter is that of 7 or 8 needles per inch, measured in one of the needle beds, which gives an article with about 9 stitches per inch finished. The yarn selected is a three-ply woolen or semi-worsted spun, or a finer thread four-ply may be employed. The color is the regulation khaki, but in place of the mixture produced in carding, we more frequently have the solid khaki shade dyed at one operation.

The cuff is worked in the half cardigan stitch in preference to the full cardigan for several reasons. The full cardigan stitch allows a larger weight of yarn to be inserted and gives a warm cuff for the wrist of the wearer, but it has the disadvantage that it tends to fill out in the width and after a short period of wear loses its form and shape. The half cardigan stitch accommodates much more yarn in the cloth than the plain rib fabric and at the same time preserves to a large extent its grip on the wrist on account of its inherent elasticity. Thus the glove is warm at that part and at the same time maintains its hold, keeping it neatly in position.

The rib used is the 1 and 1, which insures that all the needles on the given width are in use. For the article in question the dimensions would be 36 ribs round the cuff, which would involve 36 needles in the front bed and other 36 on the back bed of the machine. The cuff would be worked with about 14 courses per inch and the total number of courses in the cuff would number about 36, which would give about 2½ inches in length. This is to the short side, but for this class of article it is undesirable to have the cuff long because it tends to hamper the free movement of the wrist and also impedes the rapid withdrawal of the glove. A welted portion is inserted between each cuff part as it is worked on the frame and the cuffs are made in long lengths, each being divided off from its neighbor in the usual way so that they can be readily separated.

GRAPHICAL DETAILS

The cuffs are made twice the width of the hand as they have to be doubled over on the machine on which the hand portions are made. To explain this next step it will be necessary to refer to Fig. 1, which is drawn out on squared paper on the exact principle of the gauge. That is, every square in the width represents a needle in the machine and the various widths of fingers, hand, etc., can be measured off in stitches by counting the squares at the various points.

For the hand and fingers the courses per inch are somewhat fewer than is the case for the cuff, the 9-needle article having 12 courses per inch. In taking the lengths therefore, one-third has to be added to the squares given to obtain the exact number of courses required in the hand and fingers.

The cuff is marked and shaded in dark lines and it should be noted that to produce this, 36 ribs are required worked in the 1 and 1 rib stitch. The cuff portion is worked at full width so that there are 72 individual stitches in the entire width and this cuff portion is now folded over its centre line with 36 stitches run on to the back needle bed, and 36 stitches on to the front needle bed.

When this is done the most direct way and the usual manner of procedure is to set the cams of the machine to produce circular work and make the hand and fingers in the form of so many circular portions of their respective widths and lengths. In the standard sample under consideration, however, this has not been done, the hand and fingers being made in the form of a circle but without having the thread connected at one of the sides. That is worked a course to the right on the front bed, one course on the back bed to the left, one course on the back to the right, and one to the left on the front needles. In this way the thread passes from the back to the front bed on the right hand side only, and vice versa from the front to the back bed on the return journey. The thread never passes from the front bed to the back bed on the left side of the machine which causes a seam to be made along the left side of the glove and along the left side of each of the fingers.

As this means a considerable amount of extra work it is a little difficult to explain the reason. Perhaps there has been a scarcity of machines suited in respect of their cam arrangement for making circular work and the goods have been accepted from the plant actually possessed by the manufacturer. More likely, however, it has been found that when the hand and finger portions are made in the form of perfect circular fabric, there tends to be a contraction from the desired length; by making them with a seam at the edge, they receive an article of ampler proportions.

KNITTING THUMB AND FINGERS

The remaining details may be learned from consultation of Fig. 1, beginning at the point M where the cuff is attached to the hand of the glove. This piece is made in plain stitch as indicated at uniform width up to the point N, the number of needles in the width being given as 36, similar to the number of squares in the width. For the length from M to N are counted 18 squares, and this with the added third gives 24 courses of loops inserted up to the ball of the thumb. At this point a number of stitches (14) are taken off on a white cotton thread to the width shown, this being to provide free stitches when the thumb portion comes to be added later.

Meantime the second part of the hand is continued as for the first part up to P, at which point the fingers have to be added to the hand. In counting the squares for the second portion, we have again 18, which with the third added gives 24 courses in the length from N to P. At this point all the stitches comprising the hand, except those from e to g are removed from both front and back beds on a white cotton thread after which the machine is continued in work to add the finger A, the width on each bed being e f g, or 10½ squares or stitches as shown in the diagram.

This strip of fabric to clothe the first finger is continued as shown. The number of squares given in the length of

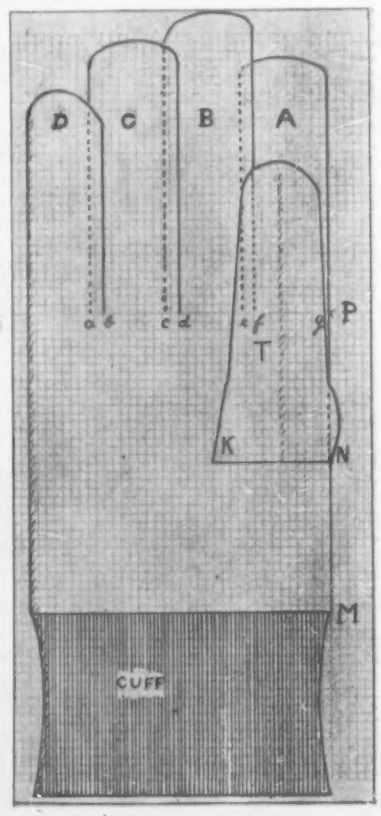

FIG. 1

finger A is 30, which with the third added gives the number as 40 courses in the length of the part. When this has been inserted narrowings are made for a few more courses so as to give the proper tapering shape at the extremity.

The remaining four fingers may be added on this machine, or as is more generally the case, they may be handed over to the fingerer operator who adds

TRADE MFG. MARK

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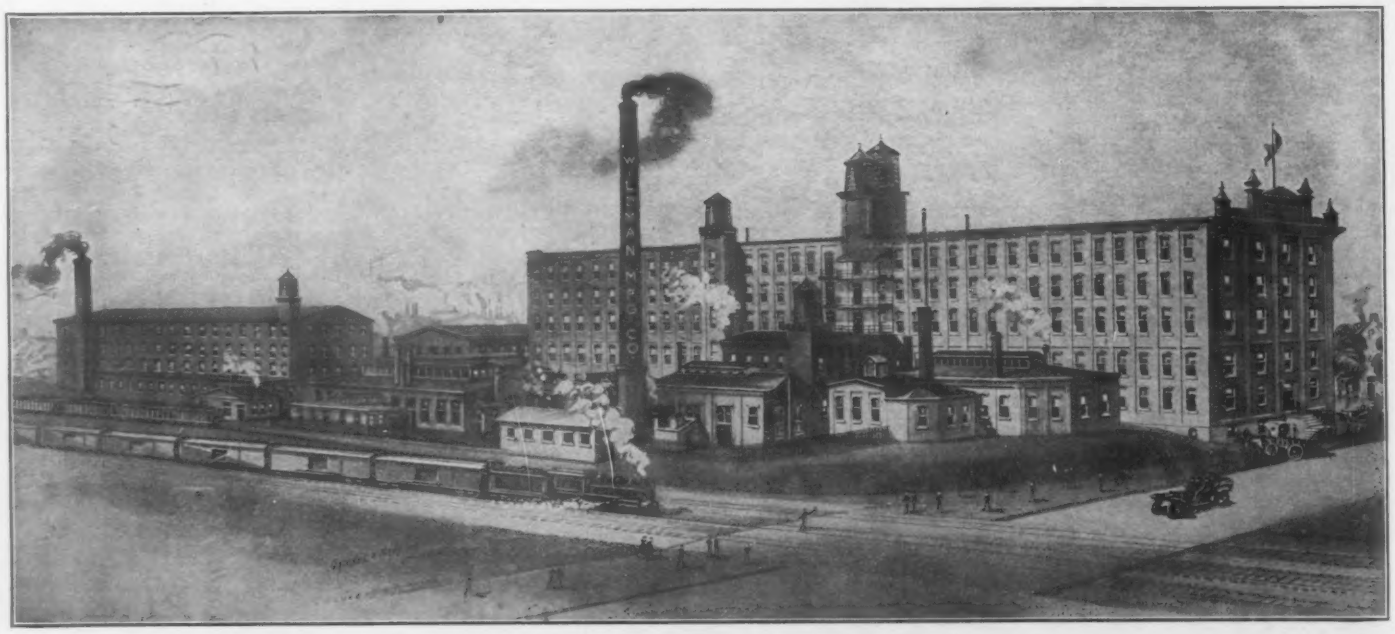
President



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the other fingers on a machine only a few inches wide, and which can be worked by them at a much higher rate of speed. In this operation the chief part of the work is the picking on of the stitches, transferring them from the white thread to the needles of the machine in their correct number. At the same time each finger must have about 2 stitches extra on both front and back beds to give the overlap or gusset, which provides the necessary extra fabric required to wrap completely round the finger.

OVERLAP OR GUSSET

The proper taking of the overlap or gusset is one of the most particular and difficult parts of this work and a very common error is to have an enlarged stitch just at the join of the fingers, which is a very grave defect in such an article. The fingerer first places the stitches for finger B on the needles of the machine, these being shown as extending from c to f. The part e f representing about 2 stitches for the gusset or overlap. This taking place on both front and back beds gives a total increase of about 4 stitches, which gives greater amplitude to the finger. The total length of this finger B from base to tip is given by 35 squares, which with the third added gives 47 courses in the length.

The procedure is repeated similarly for fingers C and D in their turn, taking into account the varying lengths and widths as indicated by the squares. Thus for finger C the width, including the gusset or overlap, is 10½ squares or needles, while the squares in the length give 32, and with the third added represent 43 courses from base to tip. For the little finger D, the width is given by 9 squares and the length 26 squares, which with the added third gives a total of 34 courses from base to tip. The thumb is next added, which is done at the part N K on the 14 stitches formerly taken off the needles on the front bed. These are run on to both front and back beds of the machine and a considerable widening is performed to give the extra fabric required for the ball of the thumb. When this is completed, the piece is narrowed to form the middle and upper part of the thumb, as shown by the shape of the diagram T. From base to tip the thumb numbers 36 squares, which is about 48 courses knitted on the machine.

EXAMINING AND MENDING

In the operation of knitting these articles, defects in the yarn and needles often cause imperfections to be produced in the fabric, and the custom varies in different factories as to what has to be done with these. In some cases they insist that the worker must produce the gloves free from holes and dropped stitches. This causes a considerable amount of time to be occupied by the machine worker in repairing these defects, and they are often repaired very hurriedly, the stitches being drawn together instead of being built up afresh and joined securely.

In such cases the tendency is to skimp the work and to adopt all kinds of subterfuges in order that the fabric may at least appear perfect. In the general run of cases, however, it is recognized that a much better system is to enjoin great carefulness of work on the part of the machine operator, but at the same time to allow the dropped and defective stitches to be passed on to the examiner for repair. These examiners are specially trained for the work and they acquire considerable skill and speed in rehabilitating the broken texture. When this has been done, the articles are passed to the seamer for the edges of the hand and fingers to be seamed together, this being best done on the point seaming machine where each stitch on one side of the finger is placed on the seaming point along with the identical stitch on the opposite edge, so that the two edges are kept perfectly straight and level, the puckering so often seen on other varieties of seaming being avoided.

In the interest of greater output the manufacturer is not required to do much else than this; scouring is usually omitted, the endeavor being to supply a yarn as free from oil as possible and to keep the articles clean in the process of knitting. They may receive a light scour if the materials are more dirty than usual, but more generally they are passed on for a short treatment between the plates of the hot press, after which they are packed and dispatched to headquarters, where they receive the customary examination and from which they are issued to the various quartermasters in the depots, and then supplied to the soldiers.

Care of Leaded Needle Cylinders

Point That Manufacturers Should Consider in Purchasing and Operation

By *Ernest Tompkins, M. E.*

THE needle line is supposed to run true. In practice it is never absolutely true and frequently it is so untrue that serious trouble results. Neglecting that untrueness, which is due to a poor mould or to poor pliering, let us consider that which is due to the cylinder itself. One would think that it would be a simple matter to make an iron wheel run true, but if he had to undertake the task without considerable experience he would realize his mistake. If cast iron did not have a hard surface scale, if it did not contain blow holes and hard spots, if it did not spring out of shape, and if a lot of other conditions which do exist did not exist, then the problem might be simple.

The untrueness of the needle line is divided for convenience of consideration into two variations—one to and from the center of the cylinder and the other to and fro parallel with the axis of the cylinder, or up and down for the ordinary upright machine. Of course these two motions are generally combined, but the question is simplified by considering one motion at a time.

Consider variation to and from the center on say a fleece machine, as this presents most of the elements which enter into the question. The needle line will run at a greater or less depth in the sinker-bur. When it is deep in the bur the stitch will be drawn long and the blades will hug the needles, and when it is shallow in the bur the stitch will be drawn short, and the blades will be loose in the needles and likely to overreach.

At the backing-bur the effect is different, for the backing-bur does not draw a loop, it merely bends back certain needles, generally every third one, and lays the yarn between those needles and the ones which are not bent, allowing the needles to draw the yarn as they spring back into line. But the bur must be sufficiently deep to bend all of the selected needles enough to get the yarn down in front of them; so, if the needle line is out of true centrally, those selected needles which are farthest from the center are bent excessively. Now this method of feeding the backing yarn is hard on the needles when they are bent only the necessary amount, so it is still harder when the line is out of true.

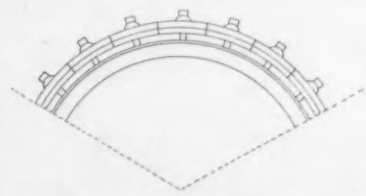
In many cases when the knitter is wondering what is breaking needles at the shank he would see very clearly if he would observe the fluctuation of the needle line as it runs through the backing-bur. The push-downs cannot be set satisfactorily as they have to be set away from most of the needles to avoid rubbing those that come nearest the center of the cylinder; however, the allowable variation in the trueness of the needle line does not seriously affect the operation of the push-downs.

The operation of the lander is considerably affected by an in-and-out weave of the needle line. The lander blades in engagement with the needles are supposed to extend low enough to surely raise the stitches on the shanks of the needles, and high enough to surely land those stitches over the point of the closed beard. It is necessary for good operation that those limits be maintained with considerable accuracy, but each limit is changed by untrueness of the needle line. When the needles are displaced toward the center of the cylinder the lander blades may dig into the leads, and land the stitch so high that it casts off prematurely, and when the needles are displaced from the center of the cylinder the lander blades may not get in under some of the stitches but punch through them, and those stitches which are raised may not be landed high enough on the closed beards to avoid tucks.

The condition at the pressers is similar to that at the backing-burs—to properly close the beards of the needles which are farthest toward the center of the cylinder, the other needles have to be pressed excessively, so breakage of the needles at the shanks is encouraged. There is another complication at this critical juncture of push-down, lander and presser. This is a distressing position for the needles. They are in engagement with the lander blades and are doing the considerable work involved in raising the stitch, and yet they are pressed into the lander-bur by the action of the presser. Even when the needle line is true the adjustment here has to be nice to insure good results; when the line is out of true it is impossible to avoid brutality to the needles at this point.

The clearing-bur and cast-off are not much affected by an in-and-out weave, the clearing-bur's tendency to come down on the heads of the needles is slightly increased and it cannot clear the needles of waste quite so surely as otherwise; the cast-off will have a tendency to strain some stitches and slight others, but the cast-off has a much greater range of limits of action than has the lander.

Variation of the needle line up-and-down does not affect the operation of the machine as adversely as the in-and-out variation. The sinking, backing-bur, and presser are affected very slightly; the push-downs, clearing-burs, and cast-offs are affected to a greater extent; and the lander is affected the most. Evidently, a combination of these two variations of the needle line may make the landing problem serious.



PLAN OF A PORTION OF LEADED NEEDLE CYLINDER, SHOWING HOW THE CAPS, WHEN THEY STRIKE EACH OTHER, FORM AN ARCH WHICH SPRINGS THE RIM OF THE CYLINDER

The conclusion to be drawn from the discussion so far is that every cylinder should be tested before it is accepted. There are three faces, forming what is called the hook of the cylinder—the portion on which the needle-lead rests. These three faces should be tested in turn by a pointer held very close to them as the cylinder is slowly revolved, preferably by power, on a well fitting stem.

The needle-caps, the clamps which hold the leads, are considerable of a problem. Most people are in the habit of considering iron inelastic because it bends inappreciably under ordinary force. They forget that strain is proportional to stress, and that steel may be pulled something as molasses candy is, provided the requisite force is applied. Considering this in connection with the known force of a screw—especially of many screws working in conjunction—we see that the cylinder line may be distorted by injudicious tightening of the cap screws.

Take an extremely bad case, but one which frequently occurs in practice, namely the distortion due to needle-caps which strike each other around a considerable portion of the cylinder. The drawing illustrates this case. The cylinder rim is unsupported for a considerable distance—120 degrees in the drawing, and seldom less than 90 degrees in practice. The needle-caps form an arch, toward which the rim is drawn by the cap screws. Under ordinary conditions, the caps do not touch, and the pull of the screw is expended in clamping the needle-leads against the cylinder; so the tendency to distort the rim is slight. But it is easy to see that a muscular knitter, exerting his muscle in tightening the screws in the above combination, will pull the cylinder rim so out of shape that the needle line will appear to be drunk.

This trouble is not likely to occur in new cylinders, because the makers generally provide sufficient clearance between the caps to avoid it; but when the cap leathers flatten down the caps may come together. The knitter may not realize the importance of renewing the leathers, or he may not have time to do so, and many of the cylinders in the room may be thrown out of true in consequence. Fortunately this trouble disappears when the cause is removed.

It is evident that a slight degree of distortion may arise when only two caps interfere; and this may not occur from insufficient thickness of leather but from improper location of the cap before it is tightened. The hole in the cap is purposely made larger than the screw so that the cap may be tightened without binding on the shank of the screw; but evidently this play in the screw hole permits the placing of two caps near together before they are screwed down, and sometimes they may touch before they are screwed down.

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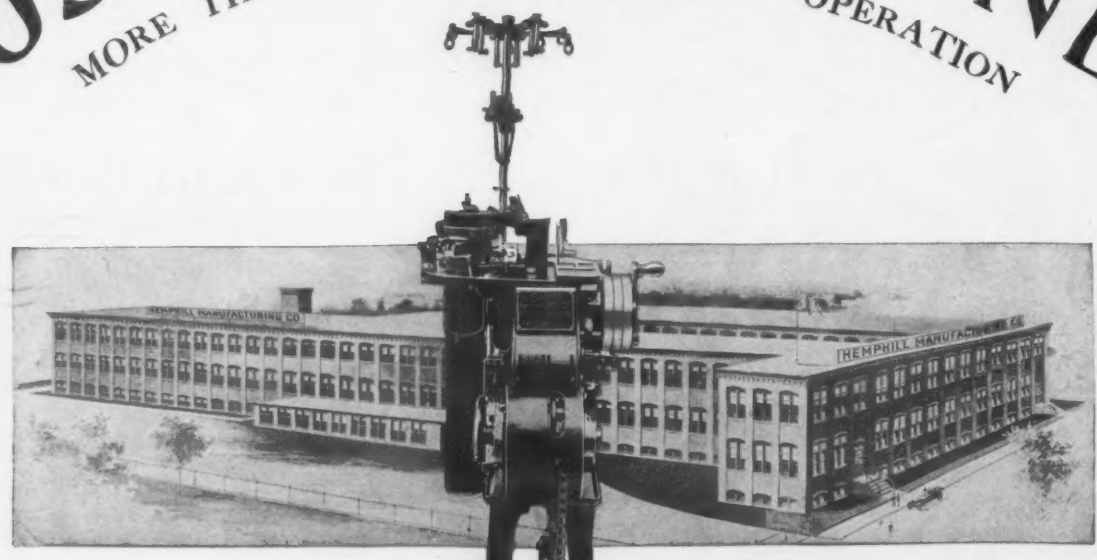

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Then they will press against each other when they are tightened, for tightening moves them nearer to the center of the cylinder.

FITTING THE CYLINDERS

The hole in the hub of the cylinder is frequently a source of trouble. It is desirable that cylinders be interchangeable on one stem; for it is not only troublesome but costly to provide a stem for each cylinder. However, it is difficult for the machine manufacturer who undertakes to provide interchangeable cylinders to maintain his standard as to size and taper of hole. Generally the hole is bored, rough reamed, and finish reamed; and no expense is spared to procure the best reamers and keep them in first-class order.

Sometimes the hole is small and the bottom of the hub will not go down to its bearing surface. If the cylinder is turned back and forth a little and then lifted off the stem, the tight place may be located by examining the stem and the hub, both of which will show brightest where the pressure is the greatest. Some knitters locate the tight spot in the hole and go at it with a half-round file, or even go at it without locating it. Don't. There are few surer ways of spoiling a cylinder. The maker of it will be disgraced by its subsequent operation or be put to loss by having it thrown back on his hands; and he would much rather remedy the trouble before it is made irremediable.

If the cylinder goes down all the way on the stud, it should be rocked by working one side up and down. In any case, a very slight amount of play will probably be found. Careful listening will detect a "chug" as the hub strikes one side of the stem and then the other; also, the oil around the top of the stem will be forced out or drawn in to a slight extent. If the play is excessive the maker of the cylinder should be called on to make it right.

DISTORTION BY GEAR

The cylinder gear is frequently to blame for lack of trueness in the cylinder. This gear is generally keyed or set-screwed on the hub of the cylinder. It was at one time claimed that the key, and even the set-screw, could be so adjusted that the cylinder hub would not be distorted; but very careful investigation showed that it was practically impossible to adjust a key so that it would not distort the hub. And even when the finish reaming of the hole was done after the gear was carefully keyed in position, the hole would be distorted. When one considers that it is a common practice to change gears in the mill, he is not surprised that so many cylinders run out of true. A comparatively recent innovation is a gear screwed on the hub against a substantial shoulder. This practice, instead of distorting the hub reinforces it, and facilitates renewal of the gear without danger of throwing the cylinder out of true.

New cylinders are likely to grind fast on the stem unless the hole and stem are thoroughly cleaned before the cylinder is put in place, and are kept well oiled for a considerable time. The better the hub fits on the stem, the more chance there is for a piece of grit to get to cutting; and unless the trouble is detected and the source of trouble is removed the hole in the hub may be badly scored.

In connection with the trueness of cylinders, a word about second hand cylinders may not be out of place in the interest of all concerned. There are parts of a knitting machine which may safely be bought second hand. The knitting table itself is almost indestructible. But the cylinders are so prone to have defects right from the beginning, and are so sure to have defects added to them that it is a wise knitter who can buy them second hand advantageously. Consider the history of a cylinder. Let it be good to start with; it sees service, so the hole is worn. Possibly it was used in connection with an automatic striper and the hole is worn on one side. It has been run on different stems; one or more of the stems was a tight fit, so someone filed the hole out. Such a cylinder is expensive as a gift, unless it is bushed. That may be done at considerably less than the cost of a new cylinder, yet when it is done the old cylinder is practically as good as new.

Commercial and Manufacturing Aspects of Humidification

Advantages of Maintaining Correct Atmospheric Condition in Cotton Mills—Effects of Excessive Moisture

By Sydney P. Munroe

IN view of facts which have been brought to the attention of manufacturers during recent years, it is surprising how large a number of mills are conducting operations either with an air moistening installation insufficient for properly regulating the condition of the atmosphere, or with no humidifying equipment at all. Some of these mills are prosperous in spite of this handicap; others are unsuccessful wholly or partly on account of it. Because of the very minuteness and involved nature of some of the data bearing on this subject, the salient facts in the case will perhaps bear repetition.

CHARACTERISTICS OF COTTON

Raw cotton contains, when mature in its native climate, from 7 to 8 per cent. of water. This water does not exist as a chemically combined constituent of the cotton, but is held mechanically within the pores of the fibers. By heating the material to a sufficient temperature, this moisture may be removed by evaporation, but when the cotton is again allowed to remain a certain length of time in the original atmospheric condition it again will absorb an amount of water approximately equal to that which it originally contained. This latter characteristic is spoken of as the "regain" of the cotton, and the amount of moisture present is usually referred to in terms of the regain as an 8½ per cent. regain.

There is a certain amount of variation in the normal moisture content of cotton, due to local and annual variation in climate in the cotton growing sections, and to variations in the amount of oil in the fiber resulting from allowing the seeds to remain in the cotton a longer or a shorter time before ginning. It will be evident that upon being removed from its native climate to a dryer one, cotton after a certain length of time will lose weight, due to the evaporation of a portion of its moisture content. This loss in weight can, however, be regained if the original climatic conditions are restored, either artificially or naturally, and the cotton given time to profit by the change. Experience has shown that raw cotton in

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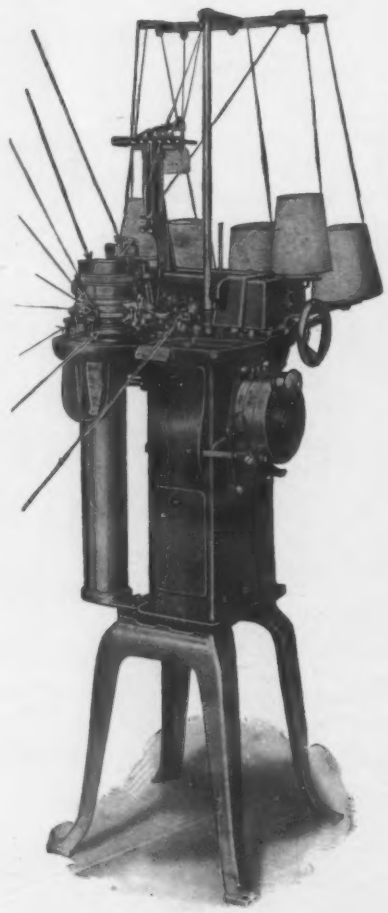

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the bale, or cloth put up in a similarly compact condition, will seldom lose a perceptible amount of its natural moisture under what may be called outside conditions such as prevail in the manufacturing districts in this country. On the contrary, cloth which before baling contained a sub-normal amount of moisture will under normal atmospheric conditions regain until its original percentage is reached.

RELATIVE HUMIDITY

Normal atmospheric conditions, however, seldom exist in mills which are not equipped with artificial moistening apparatus. One reason for this circumstance lies in the fact that temperatures within the mill are almost invariably higher than those of the outside atmosphere, due in winter to the necessary artificial heat, and in summer to the friction of moving parts and the heat given off by the bodies of the operatives themselves.

To better explain the above statement we must observe that the amount of moisture the atmosphere is capable of sustaining without precipitation is determined by the temperature, the amount being greater as the temperature becomes higher. What is called the relative humidity is the percentage obtained by comparing the actual amount of water per cubic foot of air at a given time with the maximum amount of water a cubic foot of air could sustain at the existing temperature without precipitation.

The amount of moisture which cotton will regain has been found to be nearly proportional to the relative humidity, though as the temperature rises a somewhat higher humidity is necessary to maintain a certain regain. It will be seen, therefore, that while the absolute amount of water vapor in air at a low temperature might be sufficient to maintain a cotton regain of say 9 per cent, nevertheless if the air were heated a considerable number of degrees without the introduction of more moisture, the relative humidity, and consequently the cotton regain, would be materially lowered. It is thus evident that although outside conditions may be favorable to the maintenance of a normal amount of moisture, contemporary conditions within the mill will seldom, be so without artificially introduced moisture.

As a concrete example we might instance climatic conditions in the vicinity of New Bedford. The mean monthly temperature ranges from 28 deg. F. in January to 70 deg. F. in July. The mean monthly humidities for the above months are in both cases about 82 per cent, corresponding to a cotton regain of about 11 per cent. The actual amount of water per cubic foot of air corresponding to the January conditions is about 1.45 grains, while the amount corresponding to the July conditions is about 6.5 grains.

Now assuming that the mill temperature in January was 75 deg. F., and the air within the mill contained 1.45 grains of water per cubic foot the same as the air outside, the relative humidity within the mill would be but 16 per cent, which represents a cotton regain of only 2.86 per cent. Similarly if the mill temperature during July averaged 90 deg. F. and the same amount of moisture per cubic foot of air as that in the outside atmosphere was present within the mill, the relative humidity inside would be 44 per cent and the approximate cotton regain would be 5.60 per cent.

THE COMMERCIAL ASPECT

It cannot be denied, therefore, that when we manufacture cotton goods or yarns in a mill that is not artificially supplied with moisture, the material is bound to experience a loss in weight due to the evaporation of a part of its natural dampness. There are few manufacturers who do not already know that this is a fact. But a matter of 2 or 3 per cent, more or less, of moisture in cotton does not on casual inspection appear to be a matter of much moment. Let us ascertain, however, how much it might amount to in dollars and cents in a moderate sized mill, say in a print cloth mill of 75,000 spindles.

We will assume that the cotton when opened contains an average amount of moisture corresponding to an 8½ per cent regain, and that atmospheric conditions within the mill are such as to reduce this to an amount corresponding to a regain of 6 per cent. Accordingly, aside from the unavoidable waste losses during manufacturing there has been a shrinkage in weight, due to loss of moisture alone, of 2½ pounds for every 108½ pounds of the original material. The loss on a 500-pound bale would be 12½ pounds, which, at the present high price of cotton, would be a monetary loss of about $3.50 per bale. Now a mill of this size would use about 150 bales of cotton in a 54-hour week; therefore the weekly loss would be 150 times $3.50, or $525. The loss continued for a year or fifty full weeks would be $26,250.

The argument may be advanced that the majority of mills sell their goods for a certain amount per yard. This is true, but almost invariably the goods so sold are expected to be of a certain weight per unit of length. If we are making 5-yard goods, each yard is expected to weigh one-fifth of a pound, and if this weight is not equaled an indignant complaint will promptly be received from the purchaser. It is accordingly the writer's belief that it is just as much a matter of dollars and cents to the mill which sells its goods for a certain price per one-fifth of a pound to see that that fifth of a pound contains its natural per cent of moisture, instead of a subnormal percentage, as to the mill which sells its goods by the pound.

ASSISTANCE IN MANUFACTURING

If we could ignore the commercial aspects of the humidification problem above outlined, we can find ample justification for the installation of such equipment in the assistance it affords to the manufacturing processes. The cotton fiber when under atmospheric conditions of temperature and humidity appropriate to it is very tractable and easily manipulated. If in a cold or dry condition, however, it becomes more or less unmanageable. It is thought that the difficulty experienced in manipulating cold cotton is due largely to hardening at a low temperature of the waxy covering of the fiber, which tends to make the fiber less pliable and more brittle.

Dryness affects cotton in a somewhat similar way, but the ill effects of such an atmospheric condition are greatly intensified by the fact that static electricity, to which cotton is very susceptible, exists to a much greater extent in dry air than in moist air. This free electricity, which is probably generated to a large extent by the friction of moving parts, especially of belts on pulleys, interferes with every process in the cotton mill. Machinery and metal objects become charged with it, and the cotton fibers tend to adhere to all parts of the machines and at the same time exert a sort of mutual repulsion toward each other. This, together with the stiffness which characterizes dry cotton, accounts for the rough, mushy character of yarns spun in dry atmospheres. Such yarns appear much larger than similar counts of yarn spun under favorable conditions. The yarn is also undeniably weaker, owing partly to the increased brittleness of the dryer cotton and partly to the difficulty of twisting stiff, dry fibers into a compact yarn.

Tests referred to in the *Textile World Record* of February, 1908, showed that unsized yarn of about a 25s count, lost, when the percentage of moisture in the cotton was reduced from 6.48 per cent. to 4.41 per cent., 22.3 per cent. in strength and 28.8 per cent. in elasticity. The effect of such a reduction of strength and elasticity upon the weave room production, through multiplicity of broken ends, is well worthy of serious thought. Similar tests made at Clemson College showed that an increase of 41 per cent. in the humidity of the room in which some 20s yarn was spun resulted in an increase of 19 pounds in the breaking strength of a lea.

EFFECT IN CARD ROOM

It is probably true that of all departments the card room is most neglected as regards humidification, yet the presence of moisture is of marked value in all the card room processes. The web at the card is often seen to pass over the blade of the doffer comb and wrap itself around the doffer, forming a considerable amount of waste, a loss of time and production, while the ill effects are being removed, and frequently ruining the clothing of both the doffer and the cylinder. This occurrence is ample evidence of an excess of electricity and a dearth of moisture.

At the drawing frame the combination of electricity and dry cotton results in frequent breakage of ends when the cotton bunches at the trumpets or laps up on the rolls. The finished sliver is always of a poor quality since it is very difficult to lay the fibers parallel or to keep them so when they are under the influence of electricity. The electrical action which causes the fibers to repel each other results in the loose ends of the fibers becoming disengaged from the mass of cotton in the sliver, thus making even an approximately correct parallelizing out of the question. Again, the attenuation of the strand between the rolls cannot properly be done unless the stock is in a suitably moist condition.

When the cotton is dry the forward ends of fibers, which are in the bite of the slower moving rolls, do not exert a sufficiently restraining action on the rear ends of fibers that are being drawn forward by the more rapidly turning rolls, with the result that the loose ends tend to kink up, the fibers are not sufficiently straightened, and the cotton is drawn forward in a bunchy, fluffy condition. In this process, as in all the others, when there is lack of sufficient moisture there is noticeable an excessive amount of fly and dust in the atmosphere, probably because there is a considerable increase in the number of fibers broken during manipulation, due to the more pronounced brittleness of the cotton under dry conditions.

It might here be stated that a Mr. W. Williams, an English government inspector, many years ago ascertained, by means of numerous tests, that rooms into which no artificial humidity had been introduced contained on the average 54 per cent more dust particles than properly humidified rooms. Such a saving in invisible waste would amount to a material economy in these day of high-priced cotton. If a 54 per cent reduction of this nature could be effected in a mill of say 50,000 spindles the saving, at the present price of cotton, would amount to about $7,500 a year.

At the fly-frame processes we have again to contend with the inimical influence of static electricity. It proves to be the same impediment to proper attenuation of the strand and is the cause of frequent broken ends and consequent stoppage of the frame as a result of the constant accumulation of fly within and about the flyers. Considerable difficulty may also be experienced in inserting the required amount of twist, owing to the stiffness and harshness of the dry fibers and the tendency of the loose ends of the fibers to radiate from the strand. The accumulation of fly about the creels also has a tendency to cause the roving to break back. The amount of moisture present has a marked effect, aside from any electrical influence, on the tension of the ends and when atmospheric conditions are properly controlled much less difficulty is experienced in maintaining the correct tension.

ADVANTAGES IN SPINNING

In the spinning room the evils resulting from dry atmospheric conditions are similar to those described in connection with the fly frames, but they are more pronounced, since the smaller strand is more susceptible to such influences. A characteristic of the dry spinning room, is the persistence with which broken ends lap up on the top rolls, another electrical effect. This circumstance results in a large increase in the roll-covering bill. During such dry periods broken ends multiply in all directions stick-waste is everywhere in evidence, frames are stopped for changes of travelers, rolls must be replaced, the production is greatly reduced, the spinners are overworked and angry, and it may become necessary to insert more twist in the yarn to keep the operatives from walking out.

A most important advantage to be derived from the maintenance of a uniform amount of humidity in the spinning room is the reduction in the variation of the yarn numbers. In the non-humidified mill every material change of outside conditions of moisture results in a change of draft gears, with the consequent stoppage of frames and extra labor. At the same time yarn numbers and cloth weights fluctuate considerably until equilibrium is restored.

ASSISTANCE IN WEAVING

The ill-effects of a lack of humidity in the weave room are quite apparent. The reduction in strength of the warp yarn due to its dry condition will result in frequent breakage of ends, and the magnitude of the loss that may be occasioned by this latter evil is well known. If the proper amount of moisture is present, the work of the slasher will be greatly assisted by the increased compactness of the warp yarn, its lessened susceptibility to chafing, and the reduction in the amount of lint about the loom. There will also be less tendency on the part of the filling to kink. Add to these advantages the improvement in the "feel" of the cloth, and its increased strength, pliability, and elasticity and the value of the humidification equipment, from the weaver's point of view, will be seen to be considerable.

Having recognized the fact that atmospheric electricity interferes to a large extent in all cotton manufacturing processes, we must admit that the presence of a suitable amount of moisture in the air is of great benefit to such processes, since it is well known that moist air is a better conductor of electricity than air that is less humid. It is also evident that the action of moisture in reducing the amount of fly and dust must have an appreciable effect in lowering the percentage of seconds, a large portion of which can be traced directly to the accumulation during

PAXTON & O'NEILL

FULL AUTOMATIC FIVE FINGER

Yarn Changers and Platers

Including High Splice and Double Sole.

Style of Work Changed Quickly by Simple Adjustments

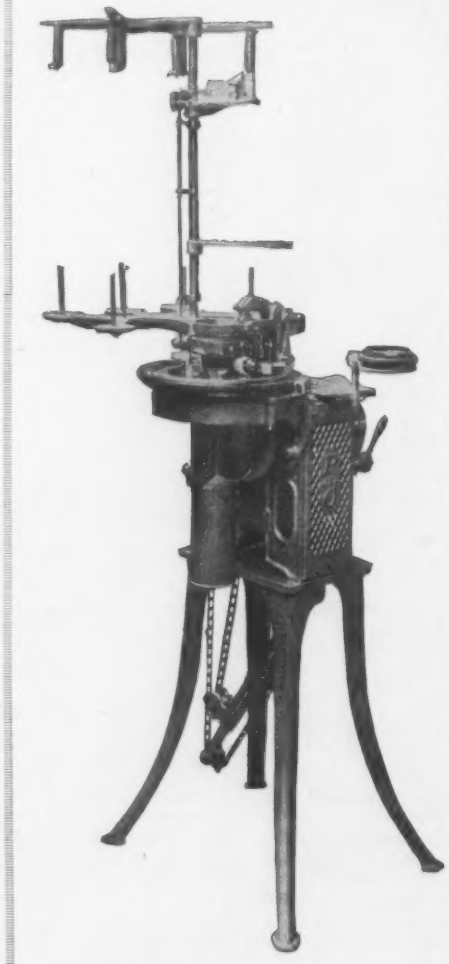
¶ This is a Paxton & O'Neill feature which should appeal to every knitter, and explains why these machines are generally the last to be stopped in dull times.

EASY TRANSFER

¶ Rocking Sinker—A distinctive feature of our machine, which makes the best fabric.

¶ The drum that controls the changes is concentric with the cylinder, and every part easy of access for adjustment.

¶ An accurate and easily adjusted control of stitch at all points.



Revolving Needle Cylinders Quickly and Easily Fastened or Removed

¶ With full control of splicing finger, splicer can be put in half way or all the way around, at any point of the stocking.

¶ In plated work, with two strand or heavier silk, makes perfect plating in high splice and double sole, as well as in the body of the stocking.

¶ Automatic loosening of stitch, in double sole, accommodating any weight of yarn and without loosening the fabric on the top of the stocking.

FOR LADIES' or HALF HOSE

¶ Makes Ladies' Hose with Garter Top. No Ravel; Silk, Plated or Mercerized Leg. High Splice, Double Sole, with Advanced Toe, Linen or Mercerized Heel and Toe.

For Further Particulars Address

Third and Green Streets **Philadelphia, Pa.**

various processes of bunches of lint and fly.

EFFECT OF EXCESSIVE HUMIDITY

It should be borne in mind, however, that excessive humidity also proves a hindrance to manufacturing, chiefly in its effect upon the machinery. It is known that an excess of moisture materially increases the amount of power required to drive the mill. Belts and bands become tighter, the traveler pull on spinning frames becomes greater, and machines throughout the mill seem to operate with reluctance. Just as a slack clothes line tautens during a rainstorm, so will the ends on spinning and roving frames become tight to the point of rupture. Roller laps are as frequent under extremely moist conditions as when the air is charged with electricity, this time because the leather rolls are moist, sticky and spongy. The ill effects of an over-abundance of humidity are especially apparent in weave rooms where leather binders are employed on the looms. The sticky condition of the leather tends to prevent the shuttle from properly entering the box, with the result that "banging-off" and smashes are frequent. This necessitates readjustment of binders, or perhaps an increase of power on the picker sticks. It often becomes necessary to reduce the weight on friction let-offs to counteract the increased drag on the warp.

In Massachusetts and some other states limits have been decreed, by legal enactment, on the percentage of humidity that may be maintained in manufacturing establishments, but in all cases the limit is sufficiently high that even an approach to it would be deleterious from a manufacturing standpoint.

To name certain temperatures or humidities as being the best under all circumstances for each or any department is impossible. The variations in the nature of the cotton used, the types of machines, and the charactertistics of the yarns and goods produced are too manifold. Even the results of carefully made tests on these subjects differ to a considerable extent. The consensus of opinion seems to be, however, that the ideal mill temperature is in the vicinity of 75 deg. to 80 deg. F., and that the most advisable relative humidities are, for the carding, spinning and weaving departments, respectively, 55 to 60 per cent, 65 to 70 per cent and 70 to 75 per cent.

CHECK HYGROMETERS

It might be well to emphasize at this point the importance of exercising the greatest care in the purchase of hygrometers or instruments for measuring humidity. Furthermore, the directions regarding the care of such instruments should be rigidly adhered to. If the wicking about the wet bulb or the water supplying it are allowed to become foul or clogged, the instrument may register 15 or 20 per cent higher humidity than is actually correct. Such neglect leads only to self-deception. It would undoubedly be profitable for any manufacturer to have the accuracy of his hygrometers checked from time to time.

Production of Persian Rugs

Descriptive of Primitive Oriental Methods

IT is difficult for any one accustomed to the highly systematized industries of America to conceive of the primitive methods by which the people of Persia produce their carpets, world-renowned for beauty and durability. Despite the fact that their manufacture constitutes a national industry, eclipsing in value of product and in number of workers any other industry in the country and relegating even the tilling of the soil to a secondary place, nevertheless the conditions under which they are produced show but little progress during the past four centuries.

The weavers comprise not only the adults but also the boys and girls. In some cases the latter are of a startingly immature age. The work at the present time is done mainly for European or American firms who deal with the weavers either directly or through brokers. In either case a contract is made for a finished carpet of designated size and weave, to contain not fewer than a certain number of knots per unit of measurement corresponding to a square inch, and to be delivered within a stated number of months. In some sections of the country, a 9 x 12 carpet will take a year or more, while in others it will require but a few months. The time depends on the tightness of the weave, on the number of weavers working on the carpet, and on whether or not the weavers are able to devote their entire time to the work. Payment is made on the basis of a zar (approximately 1 square yard). In some localities 90 per cent. of the total cost is given when the contract is drawn up and the remainder on completion, while in others, smaller payments are made at stipulated intervals.

DYEING OF THE YARN

If, as in a large number of cases, dyed yarn is furnished the weaver by the contracting firm, this is paid for by the weaver at a prescribed price per "man" (about 6½ pounds in Northern Persia and 13 pounds in Southern Persia). This necessitates the maintenance of a dyehouse in connection with the offices of the firm. In the past this has been in the charge of a native dyer, who employs the natural colors, but before the war started many firms had started to introduce synthetic dyes, and had imported men familiar with their use. In cases where the weaver dyes his own yarn, he purchases the wool in the bazaars, and either has it colored by a professional dyer or else produces his own shades. This last method is probably the most typical one.

The yarn is usually dyed in earthen vessels accommodating from 10 to 15 pounds of wool, or in copper kettles under which a fire of thorns and meadow grass is made.

The wool is first thoroughly washed, and mechanically beaten to rid it of foreign particles which adhere to the threads. For the production of reds, the yarn is mordanted with alum and dyed with madder. For blues, indigo is used, either in a fermentation vat or as the acid extract produced by cooking indigo with sulphuric acid. Naturally the shade produced by the latter method is of a decidedly inferior fastness. Browns are produced in some cases by skins of walnuts. Various other native grains and plants are used, prominent among which is henna. This color, by the way, is also used to redden the beards and finger nails of the Orientals, which to their conception greatly enhances their beauty. The dyeing itself is of sufficient interest to dwell upon for quite some time, but space does not permit.

THE LOOM

Weaving is usually done in the cellars of the houses where the lighting and other conditions are unspeakably bad. The looms are huge wooden frames, formed by four rough logs. The warp threads are strung from the top to the bottom and tied securely

WRITE TO
FLORENCE
THREAD CO.
FLORENCE, N. J.

IF YOU WANT
SEWING and SEAMING
THREADS

Of any quality or size.

You are sure of getting exactly what you order in size and quality; accurate color matching; wound in any manner or length; mercerized or plain cotton. Prompt delivery guaranteed.

ALL COLORS
SPOOLS, TUBES or CONES

QUALITY—THE BEST
SERVICE—DEPENDABLE
PRICES—MOST REASONABLE

FOR MAKERS OF ALL KINDS OF SILK OR COTTON FABRICS

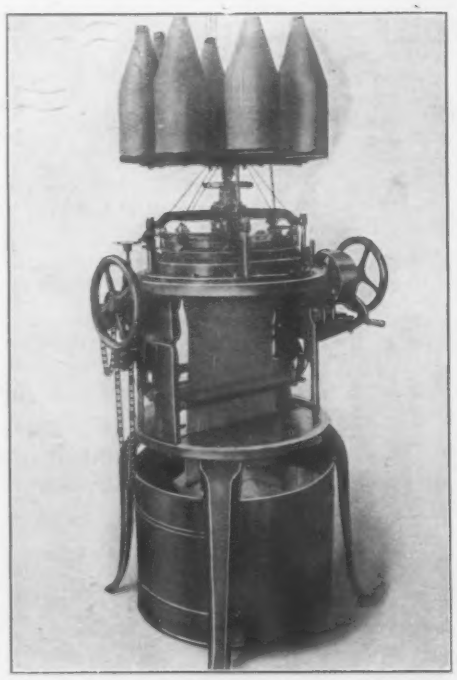
Soft finish cotton yarns; also glazed or polished yarns for warps or filling, in all sizes and colors, wound on spools or tubes, single or multiple ends.

FLORENCE THREAD CO.
FLORENCE, N. J.
BELL TELEPHONE

This is the

Circular Rib KNITTING MACHINE

you ought to get



WE illustrate here our Automatic Rib Underwear Machine, especially adapted to quantity production of perfect quality.

This machine is built by specialists and for consistent and reliable work it is unsurpassed. We call attention to the sectional dial and sectional cam rim. Features appreciated by experienced users of circular knitting machines. The needle cylinder and dial are made of the finest steel forgings and tempered to the ideal hardness eliminating both wear and break. The precision with which the cams (shaped of high grade tool steel) are made and the smoothness of their performance is a revelation. Altogether it is mechanically supreme, and its operation will fulfil the most optimistic expectations.

These machines are made for all classes of knit fabrics. Write us if at all interested.

MANUFACTURED BY

JOHNSON KNITTING MACHINE CO., INC.

St. Johnsville New York

Makers of the

SNYDER MACHINE

Formerly made by H. P. SNYDER MFG. CO., Little Falls, N. Y.

around the upper and lower beams. In some cases the lower beam revolves by being placed in free sockets and provided with a primitive handle or crank. This serves to tighten the strings and also to wind up the rug as it is woven. In cases where no such arrangement is provided, the weaver works on a scaffolding placed in front of the loom and raised upward by pulleys as the work progresses.

The warp threads are, of course, generally cotton. The fineness of these threads and the number placed in a given space depends upon the quality of the rug which is to be produced. Furthermore, in some cases domestic thread is used (for instance, for mahals, mossouls, etc.). The balls of vari-colored yarn are hung from above, within reach of the weaver. These constitute the woof and are knotted to the warp threads by the worker and then cut off. The design is planned on graph paper in which each colored square represents a knot. In this way the weaver is able to determine the number of knots of each shade to be used to produce the desired design. In certain centers, such as Kerman, where the work has become somewhat more systematized, the design is read off in a singsong voice by a man who directs the weaving—for example, "One blue, two red, four black, two blue, etc." The weaver works from left to right and as each line is finished he combs it and hammers it down to insure tightness of weave, and then clips it evenly with shears.

It can well be imagined how long a time is required by this slow method for the production of a good-sized carpet of fine weave. Even if the work went steadily on it would be slow, but consideration must be taken of the Oriental habit of procrastination. It requires very little cause to completely stop the work for an indefinite period, and it is generaly only through pangs of hunger that the worker feels forced to resume his weaving. Often he has spent the entire money paid for the carpet and borrowed on his next contract long before he has completed the first.

The finished rugs and carpets are shipped by caravan to the nearest port. This often requires many months and is attended by great risks since in many cases an entire shipment may be stolen on the road. The manufacture of Oriental rugs means tying up capital for an indefinite period, and furthermore is attended by hazards such as feature probably no other industry. Nevertheless the carpets cannot be reproduced either as regards appearance or wearing qualities by a mechanical loom, nor is hand weaving possible in any other country except where, as in Persia, the people live on an unbelievably small income and lack all ambition for betterment. Where a native contracts for a carpet and employs young girls or boys as weavers, he pays them about 25 or 35 cents per week. This is sufficient to provide not only for the worker but for one or two members of his family besides.

The day may come when a factory system is possible in Persia, but it has often been tried without success. Until the railroads and other modern improvements are introduced the present methods are likely to prevail. The only change which seems slated to take place is the use of synthetic dyes. This had obtained some foothold before the war and will probably be resumed when peace is secured. This does not necessarily mean that the quality of the product will be harmed, since it is well known better and faster types of synthetic dyes are equally as satisfactory as the natural coloring matters.

EFFECT OF WAR

The above description is based on personal observation immediately preceding and during the first six months of the war. Since then the industry has been hopelessly crippled and it is doubtful if one-tenth of the normal number of rugs is being produced. The withdrawal of foreign capital and the resulting impediment to the work has been a most lamentable blow to the vast numbers of natives who depended upon the weaving of rugs for their sustenance. Many of these have been reduced to starvation and mortality has increased by leaps and bounds.

White Interiors Cut Coal Consumption

Mills That Fully Utilize Daylight and Artificial Light Perform a Patriotic Service

By *George B. Heckel*

IN these days of soaring prices there is one commodity that has not advanced and that shows no tendency to advance. That one thing is sunlight. In the United States, at least, we have not and probably never shall have a window-tax, therefore the beneficent light of the sun is as free as air, and certainly much freer than water.

That being the case, why is it not eagerly utilized to the limit? Why do many of our workers labor in twilight factories? Simply because the older engineers did not know how to keep the cold out and at the same time let the daylight in.

The modern engineer who, in the light of our present knowledge, would construct a dark factory would be regarded as an incompetent. In the case of some of our older structures, it would probably really pay in dollars and cents to scrap and rebuild. Artificial light generally involves an expenditure of coal, and unnecessary consumption of coal is a serious anti-social practice.

But the badly lighted workroom is not generally hopeless. Daylight can be coaxed into many ill designed rooms by means of exterior prisms, reflectors, etc., and equally distributed by interior wall painting.

CUT COAL CONSUMPTION

Even in those cases where the problem is apparently hopeless and where artificial illumination is essential, proper utilization and distribution of this light will improve the illumination and cut down the coal consumption.

This fact has been so abundantly and so completely demonstrated that proof is no longer necessary. The mill owner who does not know this is willfully ignorant, since the facts are set before him persistently and insistently. These days, however, are days of teamwork and perhaps even the most "sot-in-his ways" owner, when he realizes that coal-saving is a patriotic service as well as a money-saving practice, will wish to know how he may help.

A SIMPLE PHYSICAL LAW

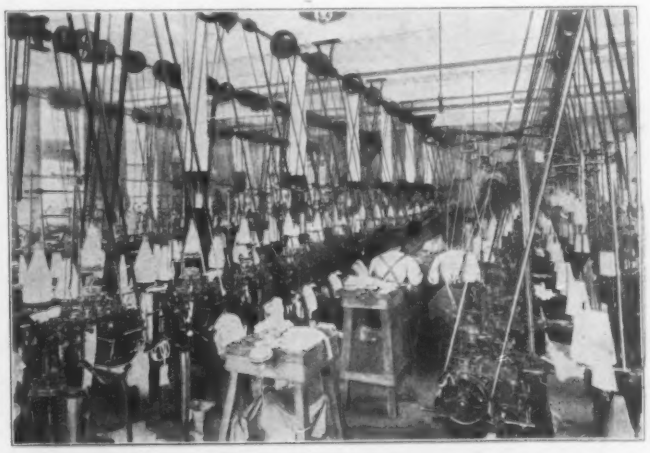
The method is simple: Paint the interiors with Mill White and keep them clean. The effect of such treatment is dependent upon one of the most familiar of physical laws; light is absorbed by dark surfaces and reflected by light surfaces. Therefore if we wish to use the light generated by the burning of our coal pile to see by, we should provide for its distribution and diffusion. If on the other hand, we wish to demonstrate the law of physics, that certain substances absorb a certain percentage of the light falling upon them, dark or dingy walls will serve most effectually.

I had the pleasure, in an article on this subject in the June 2 issue of TEXTILE WORLD JOURNAL, to cite an investigation made at the Institute of Industrial Research, in which the relative reflecting powers of a number of tints and shades were accurately measured. This investigation clearly indicated the relative luminosity of decorative paints; but it required no research to tell us that if our first aim is to utilize to the utmost our available illumination, white is the only admissible color for our reflecting surfaces.

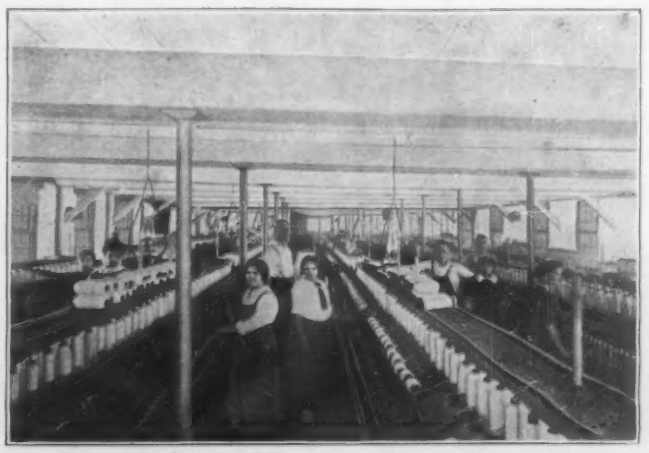
The Mill Whites were developed on a strictly economic-engineering basis, their decorative function being ignored. White is a light reflector, not a light absorber, hence these industrial paints are made as purely white as the limitations imposed by materials and technique will permit, and the utmost practical permanence of color is insured by selection of component materials.

A modern Mill White would have been impossible twenty years ago. The paint trade could not have supplied an entirely satisfactory pigment nor the varnish trade a satisfactory vehicle for the purpose. The best Mill Whites as to both pigment and vehicle, are based

THE NEW WAY VERSUS THE OLD—COMPARISON OF THE ONCE DARK, UNATTRACTIVE CEILINGS AND WALLS, WITH A WHITE FINISH



MILL WHITE CUTTING DOWN COST FOR ARTIFICIAL ILLUMINATION AND IMPROVING THE LIGHT DURING DAYLIGHT HOURS IN A HOSIERY MILL



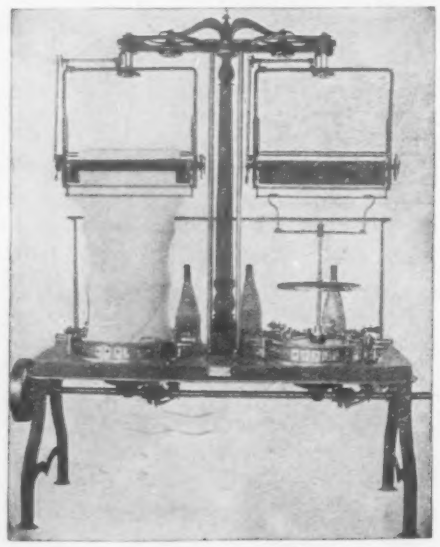
THE OLDEST COTTON MILL. A DEMONSTRATION OF WHAT MILL WHITE CAN DO UNDER THE MOST UNFAVORABLE LIGHTING CONDITIONS

ESTABLISHED 1870 INCORPORATED 1890

Get Repeat Orders by Using

Crane Spring and Latch Needle Knitting Machinery

Spring Needle Underwear Machine with Automatic Take-up



This machine is made in sizes from 13″ to 26″ in diameter of any desired gauge, the number of feeds depending on the size of cylinders.

Also built in sizes from 2½″ to 32″ in diameter for the production of a great variety of fabrics.

Aside from the feeds for plain fabrics, the stockinet, eiderdown and astrachan feeds are superior to any on the market.

SOME CRANE FEATURES

Patent removable hardened Wing Burr Wheels.

Patent Thread Stop Motion can be fitted to 20 in. and 32 in. frames and are specially adapted for making fine Jersey Cloth and Stockinet.

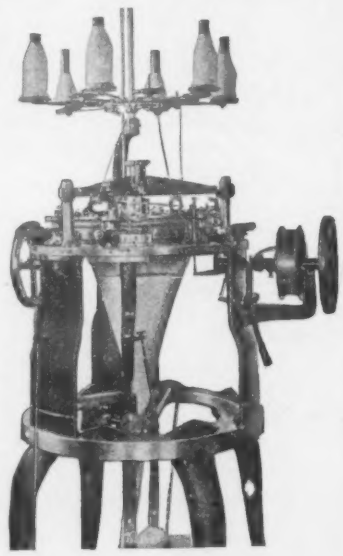
Our flat machine is adapted for knitting collarettes.

New Spring Needle Rib Machine

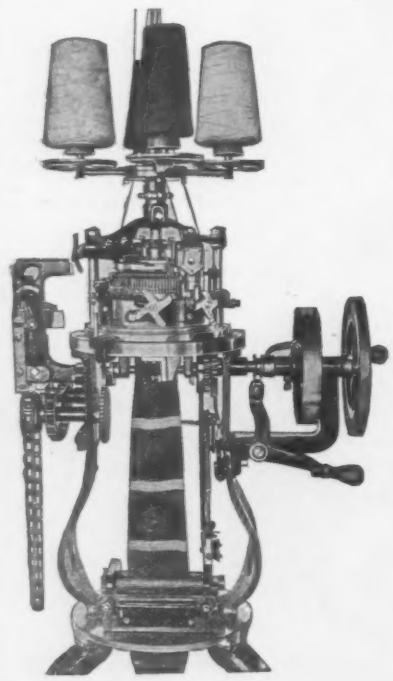
This machine has been improved in construction and equipped with new style feed, stop motion and take-up features.

All working parts easily accessible.

It is designed to make a high grade of ribbed underwear and will produce the finest fabric on the market.



Improved Automatic Toque Machine



Made in sizes from 5″ to 7″ inclusive, of any desired gauge; these measurements being back to back of cylinder needles.

These machines are built in a thorough and workmanlike manner and are second to none on the market.

The Crawford stop-motion is applied when requested.

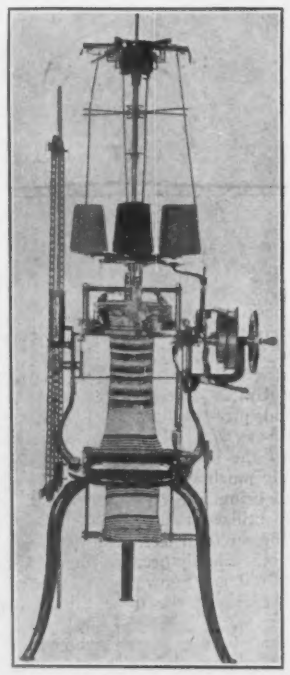
Improved Automatic 3-Colored Plain Striper

Made in sizes from 7⅝″ to 20⅝″ inclusive, of any desired gauge; these measurements being back to back of cylinder needles.

The fabrics from this machine are used for bathing suits, theatricals and athletic goods.

These machines are second to none on the market.

The Crawford stop-motion is applied when requested.



"It Pays to Use Good Machines and the Best Are None Too Good."—Our Motto

LET US SEND YOU FURTHER FACTS

CRANE MANUFACTURING COMPANY, Lakeport, New Hampshire

on the utilization of new and recently adapted raw materials; and these new materials are, fortunately, ordinarily available at economically satisfactory prices.

Even now, when all paint materials are abnormally high, the light-fuel economy effected by painting workroom interiors is immeasurably out of proportion to the cost of painting material plus cost of application.

In my earlier article on this subject, I referred incidentally to the psychological by-product of adequate illumination. The saving in the coal bill can be measured with an engineer's slide rule; but the increase of efficiency resulting from physiological and psychological consequences are immeasurably greater. The efficiency engineers have had some success in giving mathematical values to such qualities as health and contentment; but any one with common sense knows, regardless of stop-watches, that a healthy worker is more efficient than an unhealthy one.

Dress Goods Review

(*Continued from page 252*)

omy which is being so strongly emphasized. Consequently the greater number of sales were recorded in high grade clothing which could be purchased only by the well-to-do. The rank and file of ultimate consumers throughout the country discovered at an early date that new garments and Liberty Bonds could not be purchased at the same time by those of moderate means and accordingly there was a marked falling off recorded in the sales of clothing throughout the country.

FABRICS AND COLORS

Sales records showed beyond the shadow of a doubt that French serge was the most popular dress fabric with velour leading in the cloaking field. Broadcloths have sold extremely well and have not been allowed to remain in stock for any length of time. Poplins have been popular, while worsted voiles have done well. The increasing demand for sport clothes occasioned an increase in the production of jersey cloth which has sold well for the 1918 spring season. Generally speaking the year has been characterized by an excessive demand for staple fabrics, with comparatively slight demand for fancies. Owing to Government work it is predicted that cloakings for the fall of 1918 will be considerably lighter than in former years and it is stated on good authority that one of the trade's leading factors will show nothing heavier than 14-oz. cloaking fabrics.

Popular colors for 1917 spring season were gold, rose, magenta, apple green and various shades of tan. For the fall, taupe was one of the colors most in demand, while burgundy, beetroot, reindeer, light olive, browns and many blues were also sought. Military influence has made itself felt in the 1918 spring color scheme, with the result that shades approximating the colors of the uniforms of the Allies have been in great demand. Peacock blue, liberty blue, buff tan and Quaker gray come next in popularity, while rose for misses' garments has enjoyed extensive sales.

LABOR TROUBLES

Labor troubles have played an important part in production during the year. Cost of labor has increased to a marked degree but in spite of this strikes have occurred throughout the year. Chief among these is the one now in progress in the textile mills of Philadelphia. New and comparatively unskilled labor has been secured in many instances, but the lessening of production has imposed a heavy handicap upon a number of manufacturers of dress goods and many of these have been obliged to postpone their spring openings for a prolonged period.

GOVERNMENT BUSINESS

The declaration of war against Germany, which took place during April, served to inaugurate a period unparalleled in the textile history of the United States. In times of peace few mills had made an attempt to secure Government business, but with our entrance into the conflict the situation changed completely. The necessity of equipping our armies became paramount, while civilian business became a matter of secondary consideration. Specifications were issued for four fabrics: an 8½-oz. shirting flannel; 16-oz. uniform cloth; 30-oz. melton for overcoating, and a 3-lb. blanket material, and the textile industry turned its attention to reproduction of Government fabrics. Production has increased until at the present writing approximately 40 per cent of the broad looms and 20 per cent of the narrow looms of the country are manufacturing Government fabrics.

In view of the fact that their machinery was more adaptable to the purpose, men's wear mills were the first to enter the field, while manufacturers of dress goods followed more slowly. When a realization of the tremendous amount of work to be accomplished began to dawn upon the industry, dress goods looms turned to the work of manufacturing the 8¼-oz. shirting flannel. A number of mills began to produce the 16-oz. uniform cloth, while coating manufacturers accepted the responsibility for turning out a large percentage of the 30-oz. overcoating. The probability is that before the present year is over a large percentage of the looms formerly used in the manufacture of heavy cloaking material will be working on army overcoating. During the autumn stocks of cloakings were materially reduced as the result of a sudden and somewhat unexpected demand on the part of the Government for overcoat and blanket material. This created a shortage so pronounced that civilian buyers were obliged to invade the men's wear market in search of suitable cloaking fabrics.

WOOL CONSERVATION

The increasing demands of the Government upon the supply of wool and the textile machinery aroused the various branches of the industry to the pressing need for conservation of wool and woolen fabrics. A considerable saving was brought about by the decision of manufacturers of woolen cloths to limit the size of selling samples. Following this action the Commercial Economy Board of the Council of National Defense made it clear that it would be necessary to manufacture and to carry on business by eliminating the non-essential uses of men, material and equipment.

In accordance with the suggestions of the Board relative to conservation, the various branches of the women's garment trade held a mass meeting at the Waldorf-Astoria, in New York, on Nov. 27, for the purpose of taking steps calculated to bring about the desired result. At the conclusion of this meeting resolutions were unanimously adopted which, it was stated, would effect a minimum saving of 25 per cent of woolen materials used in the manufacture of all classes of women's, misses' and children's outer garments. These provided for the adoption of styles in garments featuring the slim silhouette, and furthermore provided that in the manufacture of coats, suits and dresses an endeavor should be made to confine the amount of woolen materials used to 3 yards, based on a width of 54 inches, and in no event to use more than 4 yards. It was further provided that garment manufacturers advocate the freer use of other materials such as silk, cotton, etc., in order to supplement woolen fabrics in as great a degree as possible.

Similar steps making for a saving in yardage were adopted by the United Cloak and Suit Designers Association. The Fashion Importers' Association of America also agreed not to push French models requiring more than 4½ yards of woolen fabric. The situation was further simplified by the decision of the Chambre Syndicale de la Couture Parisienne (Paris Dressmaker's Association), which announced that its members were preparing models for spring which conformed with the desires of the United States Government regarding maximum yardage of woolen fabrics to be used in each garment.

IMPORTS AND EXPORTS

Imports of dress goods for the first nine months of 1917 totaled 620,387 pounds, or 2,578,157 square yards; valued at $928,077, as compared with imports during a similar period of 1916, which totaled 900,564 pounds, or 3,563,603 square yards, valued at $1,095,530. These imports were classified as follows: France, 1917, 10,441 pounds, $24,118 value; 1916, 16,700 pounds, $36,997 value; England, 1917, 570,121 pounds, $847,676 value; 1916, 853,056 pounds, $1,016,774 value; all other countries, 1917, 39,825 pounds, $56,283 value; 1916, 30,808 pounds, $41,759 value.

Exports of dress goods for 1917 showed a tremendous decrease when compared with the preceding year. Already on the wane exports ceased on Oct. 10, when the Government placed an embargo on the exportation of all wool manufacturers in which consideration for license was shown only to goods delivered on orders which had been completed prior to Sept. 25. This embargo was modified in form on Dec. 15, although the Government stated that licenses would not be granted for merchandise having a military value. Exports of American-made wearing apparel for women and girls for the first nine months of the year totaled $415,237. Under the head "all other," in which previous to July, 1917, blankets and dress goods were included, exports for the first nine months of the year totaling $6,894,835 were recorded, as against $23,007,302 for a similar period in 1916.

Knit Goods Demand Large

MT. VERNON, ILL., Jan. 8 (*Special*).—The demand for knit goods is greater than the supply, and it does not seem possible to change this condition during 1918, regardless of what may develop. In the war condition, however, war conditions may effect costs of raw material, so I think it advisable for all factors to operate carefully and confine their operations to the immediate future.

P. C. WITHERS,
President, National Association of Hosiery and Underwear Manufacturers.

1918 a Banner Year

BAY CITY, MICH., Jan. 8 (*Special*).—Based on Government and civilian business now on our books 1918 will be a banner year for us, providing we can get needles and other supplies, which at the present time are difficult to obtain. Yarn deliveries are slow on account of the freight congestion, and the help question is becoming acute. In our opinion shortage of hosiery and underwear for civilian use will be serious and higher prices will rule.

D. L. GALBRAITH,
Treasurer, World Star Knitting Co.

Knit Goods Review

(*Continued from page 308*)

months this was not materially relieved. Spring openings were deferred, but when lines came upon the market there was a sufficient demand to consume all available stock. Within a comparatively short time the market was cleaned up, and remained quiet during the summer, not from a lack of demand, for there was a steady pressure from jobbers to fill incomplete lines. Misses' sweater coats stand out prominently in this trade and up to the year's close this demand was far from satisfied. Unseasonable weather in the early summer somewhat hurt the increasing demand for fiber silks, particularly as retailers' sales were not approximating the anticipated volume, but when the weather changed buying was renewed on a rather extensive basis.

After the declaration of war wool lines were subjected to new conditions, and selling became very conservative. Business was taken only for a delivery period extending over four months, and bona fide orders only were acceptable. Duplicate sales on the fall lines opened previous to January were made at advances of 20 per cent, but when the time approached for the new fall openings late in the year most manufacturers were frankly at a loss to know what course to puruse. However, around the normal time, or the last week in October, lines began to come upon the market. Trading was even brisker than anticipated, and in the course of a week or two the heavy bulk of restricted stocks was disposed of. Mills sold on a short delivery period only, so that duplicate business before the close of the year was impossible. Early predictions had been that prices would show an advance over the previous year of around 50 per cent, but when the lines were opened advances ranged all the way from 45 to 60 per cent.

Cotton and cotton shoddy lines enjoyed an active year, but the volume of business was restricted by the reduced productive ability of most knitters. Navy purchases of heavy woolen sweaters turned the attention of buyers to cotton and other low-ends that were used for filling in uncompleted lines among jobbers.

Worsted Yarn Review

(*Continued from page 277*)

off in demand. Both knitters and weavers were ready and anxious to prosecute Government business.

The principal handicap to a fuller execution of Government orders in the goods line was the tie-up by strikes notably in Philadelphia, where a two to three months strike of weavers has held up vast quantities of Government goods.

The increased cost of the production of worsted yarn is conservatively estimated at about 40 per cent above the cost of one year ago. Conditions of worsted yarn values as compared with early December, 1917, show no marked change.

The year 1917 closed with worsted spinners, weavers and knitters, a unit in that their production and full resources are ready for any Government need.

Year 1918 Assured

CLEVELAND, OHIO, Jan. 7 (*Special*).—"Outlook is excellent with full production assured for the year 1918. From all we can see, whether the war is protracted or not, on account of the great scarcity of material in the civilian trade, 1918 will amply take care of itself."

GEORGE H. HODGSON,
Vice-President and General Manager, Cleveland Worsted Mills Co.

Wool Reviews

(*Continued from page 298*)

pay almost any price for cloth, but one is of the opinion that they will have to wait.

In the wool substitute market the year has seen many changes. When the year opened demand was good and prices were high. For the first three months prices continued to advance, then almost without any warning prices gave way, there was a serious break and in certain lines an actual slump, but it continued only for a few weeks. Towards the end of the half year it was seen that the quantities were not being put on the market as usual in previous years. Imports were gradually growing less and less for various reasons, and rates began to advance; this they steadily did until the first week in November, when the market took a sudden turn and prices increased radically which at the time of writing do not appear to have stopped, for week by week almost all lines advance, until to-day abnormal prices are paid for most lines. The embargo on your side of the water has had its effect, the difficulty of finding room on vessels has not assisted matters and the partial stoppage of consignments from France have told its tale, although it is rumored that in the near future this may be removed. If so it will help matters considerably.

The most marked advance in price has been in knitted stock of coarse quality. Compared with pre-war prices advances of fully 400 per cent are now being paid. In kindred stock in serges the same is true, while in special lines of self colors the increase has been most marked. Fine stock has not advanced so much as coarse, still it is fully 250 per cent up. Merinos are three times the price they were over three years ago in the mixed state and here again self colors have gone out of bounds. Skirted cloth has fluctuated very much during the year. At one time, owing to the fact that coarse dark hards were not wanted it slumped very badly, but to-day it is dearer. Fine skirted is not much different from what it was a few months ago, while worsteds have advanced to an enormous extent, four to five times, and are very scarce with an increasing demand. In new clips there is amazement in the trade at to-day's ruling figures. Bespoke clips of the very best qualities are scarcely obtainable and are almost five times the price obtaining in 1914. When sorted worsteds, cheviots and serges are at artificial prices, they are being used to replace wool and this, of course, has to be faced.

The great surprise of the year has been the good supply of domestic stock. It has been maintained to a very high degree and has far exceeded the anticipations of all who are engaged in the trade. It would appear as if every corner had been scoured for supplies and sources of supply opened where before the war nothing was done. Up to the present there has not actually been a real shortage of supplies and it is stated in the trade generally that no rag pulling machines have had to stop because of shortage. As there are one thousand pickers in this country, this is a very remarkable fact. Of course, demand for wool substitutes for civilian needs has been much curtailed, but the fact is that mills generally have been able to keep their machines working.

Another feature of the year in the trade is the participation of municipal authorities in the trade. This is amply evidenced by the fact that through their organizations they are urging private dealers, municipalities and others to stimulate and organize to full capacity the collection of woolen rags. They have recognized the trade as one of national importance. The trade has responded willingly and associations have been formed with a view to conserving the supplies. The trade has been consulted through its various associations and at the moment they are working together to do all they can. They have certain views as to the future believing that after the war when mills are again producing civilian goods demand will be abnormal and it will tax all concerned to the utmost to meet it.

INTERNATIONAL TRADE SMALL

The imports so far this year are slightly less than in 1916 and much less than during 1915 and 1914, so far as bulk is concerned, but in value show an increase, owing of course to advancing prices. In shoddies imports are far below previous years, both in values and quantity. On the export side nothing was sent abroad during October last and during the year the whole quantity has been exceedingly small, probably under two hundred tons. In shoddies also exports have reached very small proportions for various reasons. They are needed at home and the difficulty of shipping has told against this trade. One feature of this particular branch of the trade is the fact that all during the year a large quantity has been bought and paid for by some neutral countries and is being held on their behalf until such times as it can be shipped. They have been willing to pay high prices, but what will eventually become of this stock one cannot say, though it may be useful at home later on.

In certain quarters it is the opinion that at the moment demand for woolen rags somewhat exceeds the supply, and that we have arrived at a point where we shall be eating into our reserve stocks. It is certain that local firms have not the quantities on hand they had a few months ago, but on the other hand not a few mills, both shoddy and cloth have big stocks laid by ready for eventualities. Some say they have sufficient for six months' work; certain it is they have orders for the finished product for a long time when they can begin to make it, and with the outlook for renewed shipments from France the prospect is not as bad as some would make it appear. All through the year the trade as a rule has acted with great caution; there has not been much speculation, prices have been far too high for that, and what has been put on the market has been pretty well used up as soon as obtained. Merchants who have held big stocks have benefited as a rule. Those who were timid have operated from hand to mouth until to-day they are faced with winter and reduced stocks. At the selling end some have been caught, they have taken large orders and have not covered when the opportunity offered. Recently they have had to buy regardless of cost; no doubt this has had not a little to do with the recent advances.

The country dealer has had the benefit of these high rates. It is generally conceded he has fared better than any other section of the trade. To-day he is difficult to deal with and almost unreasonable. Those who are in the heart of the trade have had to be satisfied with a reasonable return and have been doing their best to bring about a more regular state of things and help the country all they can. A good deal of time is now being spent by certain representatives of the trade in this and a few other large centres to bring about a more reasonable condition so far as high prices are concerned. One is inclined to think that if this cannot be accomplished by the trade itself it may be taken in hand by others concerned with a view to benefiting the country at large. It is hoped the trade will face the existing difficulties in a patriotic manner and may have the satisfaction of knowing they are doing their bit toward helping the nation in this hour of trial.

Unprecedented Demand for Substitutes

Wartime Conditions Occasion General Demand Resulting in High Prices

RECORD-BREAKING prices and an unprecedented general demand have been the outstanding features of business in the substitute market during the year which has just come to an end. The entrance of the United States into the war and the subsequent decision on the part of the Government to employ substitutes in the manufacture of uniforms, together with the ever-increasing use of reclaimed wool in civilian fabrics have served to create unparalleled conditions in the trade. Grades seldom used have become the objects of great demand and all branches of the business have been stimulated to a degree. Increased cost of raw materials have been transmitted, in the natural order of events, to the substitute field while the incessant demand has served to keep prices at a high level. In ordinary times it has been customary for business in this field to follow the movements of the piece goods markets to a certain extent and in consequence to exhibit certain periods of activity and depression. All this has been changed under the new order of things. Government demand has served to create activity in those seasons which are normally quiet. Business has moved at high tension throughout the entire year save during the closing days of 1917, when stock taking and a protracted spell of zero weather served to produce a somewhat lethargic condition in the trade.

THE YEAR IN RETROSPECT

The entrance of the United States into the world war served to create an unending demand for a number of grades throughout the year. Prior to the declaration of war business had pursued its usual course with but little change from the conditions which prevailed at the close of 1916. As spring approached and the possibility of war was converted into a certainty, the market exhibited a steadier tone while a bullish tendency became manifest. This was increased by the announcement that the Quartermaster's department would permit the introduction of shoddy and reworked wool into the fabrics to be used in the manufacture of uniforms for the army and a general boom was predicted. During March prices were subjected to an increase all along the line. This was occasioned by the advanced cost of raw materials as well as by the prospect of future demand. Inquiries increased as the result of the anticipated requirements on the part of the Government, while the knowledge that manufacturers of all-wool piece goods would of necessity introduce lines containing reworked wool served as an added stimulus to the market.

During May shoddy manufacturers received notice to postpone deliveries on incompleted orders owing to the fact that mills were anticipating Government orders on overcoats and blankets. Toward the end of the month deliveries were ordered completed. During this period wholesale graders increased their prices ten per cent, while a number registered a 20 per cent. advance.

MAXIMUM PRICES ANNOUNCED

During the early summer demand for woolen rags entering into the manufacture of fabrics for the army had increased to such an extent that maximum prices were established by general agreement of the members of the woolen rag trade and wool fiber industry. Although there were no Governmental penalties attached to any cases of non-observance of these maxima, the trade as a whole stood by the prices agreed upon and in one instance reduced the price of one of the most used grades. Government demand increased during the late summer and autumn. The decision to permit a larger percentage of reworked wool in army clothing occasioned this and the demand increased during the late fall when a hurry call was sounded for overcoating and blanket materials. The closing weeks of 1917 witnessed an ever-increasing demand for light grades of new clips and old rags suitable for army purposes.

Operations in the new clip field during 1917 were characterized by the marked absence of any accumulation of stock and the persistent advance in prices. Somewhat reduced output on the part of the mills and inordinate demand made it impossible for large stocks to be accumulated. Final inventories by dealers show smaller quantities of the various grades on hand than ever before. Few of the known grades were neglected, and at no time during the year were any of these found in what might be termed large quantities. Contrary to conditions in former years, periods of inactivity were few and far between and were of exceedingly short duration when they did occur.

Prices, which were supposed to have reached top levels during the previous months, increased steadily as time wore on. Notable advances were recorded in worsteds and serges of practically every kind while sharp increases as compared with prevailing prices during 1916 were noted in almost all other grades of new clips. The quality of the clips obtainable throughout was somewhat lower than in the past and this falling off became more noticeable as the year progressed. This was due principally to the fact that the cloth produced by a large number of manufacturers was not up to former standards. Mills which formerly turned out all-wool lines had begun to put forth fabrics embodying a percentage of reworked wool and the natural result was a reduction as to quality. All indications are that 1918 will witness a further reduction in point of quality. Acting on the recommendations of the Government and the various trade associations, manufacturers will produce an ever increasing number of manipulated fabrics though such a condition would probably have obtained without official mandate as such fabrics were necessary to meet the demand for lower-priced materials.

MAXIMUM PRICE EFFECT

The introduction of reworked wool into the manufacture of army cloths resulted in an unprecedented demand for the various grades suitable to the above purpose. As the season progressed the amount of shoddy permitted to enter into the fabrics in question was increased.

FINEST QUALITY COTTON YARNS

Mule and Frame Spun

SHARP MANUFACTURING COMPANY

Boston New Bedford New York

DISTINGUISHED SERVICE

¶In spite of the fact that 1917 brought undreamed of and untried manufacturing problems and conditions,

¶In spite of the fact that our 1917 advance business booked was by all odds the largest in our history,

¶In spite of the fact that on all sides of us orders were repudiated, contracts treated as "scraps of paper," and deliveries delayed interminably,

¶We not only

Delivered 100% of every advance order for RICHMOND UNION SUITS, and delivered them practically without exception on the date promised,

And took care of our customers' normal requirements and re-orders,

¶But in addition

We have made for the United States Army 350,000 garments which we have delivered ahead of the time promised,

And, above all, we have not departed an iota from the quality ideals and standards which make RICHMOND UNION SUITS the finest undergarments offered to the jobber today.

¶We are justly proud of this record. We feel happy to know that our Richmond jobbers appreciate fully this service, and we are glad that we were able to serve them and our country so efficiently.

¶If this kind of service interests you, write us today for more data regarding the Richmond line.

THE ATLAS UNDERWEAR CO.

PIQUA L. M. FLESH, President OHIO

Mills at Piqua, Ohio and Richmond, Ind.

In the meantime prices were rising and in order to protect the interests of the Government it became necessary to establish maximum prices on the various grades of rags and clips entering into the manufacture of Government fabrics. Members of the woolen rag trade, and the wool fiber industry, together with members of the General Woolen Committee of the Council of National Defense met during the latter part of June and agreed upon the following maxima per pound: coarse light merinos, free from cloth containing not less than 15 per cent. of serges, 16c.; coarse dark merinos, free from cloth containing not less than 10 per cent. serges, 12c.; light skirted worsteds, 15c.; dark skirted worsteds, 13c.; blue skirted serges, 17c.

These prices were ratified at a representative meeting of the trade, which was held at the Hotel Astor, New York, on June 29.

Shortly after this the Advisory Woolen Rag Committee submitted additional maxima per pound, which were also agreed upon by the trade. These were as follows: Fine light merinos, 30c.; fine dark merinos, containing 30 per cent. thibets, 21c.; blue skirted worsteds, 17c.; all wool U. S. khaki clips, 35c.; wool and shoddy U. S. khaki clips, 33c., and wool and cotton U. S. khaki clips, 30c. Some time after the establishment of the above the maximum price of fine, light merinos was reduced to 27c. a pound. Maximum prices were not established on worsted U. S. khaki clips with the result that the price of these ascended to record figures.

Export business had always proved profitable to the trade, but owing to the rumored scarcity of wool and the necessity of conserving substitutes the Government placed an embargo upon exports of woolen rags. As the result of this a joint meeting of woolen and worsted manufacturers, rag dealers and reworked wool manufacturers was held at which time a committee was appointed which drafted recommendations to the effect that the embargo be raised on woolen rags as follows: new and old felts (not woven), plain black cloth, plain dark cloth, plain blue cloth and plain brown cloth. The granting of licenses for the export of the above-mentioned grades placed the trade in a position where no hardship was endured.

Dealers in shoddy enjoyed phenomenal success during the year. Although trading at the beginning of the year was of a normal nature, the declaration of war furnished a decided stimulus to the business. Demand for khaki, oxford and white increased and was noticeable throughout the balance of the year. During the early fall demand slackened, but with the closing weeks of 1917 it increased tremendously. At the present writing the majority of factors in the trade report that they are sold up until the first of March. Prices kept pace with demand, great advances being particularly noted in merinos.

Demand for all grades of waste was also out of the ordinary, particularly in the case of wool waste. Prices also increased tremendously throughtout the year and surpassed the percentage advances recorded in shoddy.

Status of Cotton Wastes and By-Products

Perplexing Conditions Prevailing in Last Year's Market

THE principle in mechanics known as the resolution of forces, in which the direction of the movement of any object is the resultant of the several forces acting upon it, seems to be applicable beyond the range of the physical. It may be used, to some degree at least, in an attempted elucidation of the present somewhat peculiar conditions obtaining in the market for cotton wastes. The convergence of several factors upon a given quantity of waste determines its market price.

The first factor is the price of cotton, the raw material; the second, the figures at which the dealers are willing to place their contracts; the third, the prices that the consumers of cotton waste are willing to pay the dealers.

In addition to these primary factors a multitude of considerations come in to modify and change the situation: The shutting down of exports resulting in the accumulation of stocks; the growing practice of some mills to use over again their better class of wastes, tending to reduce accumulation; the combing out of less material, reducing thereby the volume as well as the quality of combers; the lessening demand for wastes consumed by non-essential industries; the general impression of mill managements that high price cotton and increased price for its by-products and wastes are parts of the same proposition; and, underlying the entire market, the basal consideration that the interests of sellers and buyers are naturally antagonistic and rarely coincide.

TRYING SITUATION ON PERCENTAGE STOCKS

These considerations, of course, apply in part to any market for materials, but seem to have become considerably intensified in last year's market for cotton waste. The mills as sellers had behind them the tremendous rise in cotton during the year from 17½c. June 4, 1917, to 31½c. Jan. 4, 1918, a rise of 80 per cent. This rise of 80 per cent in the price of the cotton fiber involved, automatically, a rise of 80 per cent to be met by the dealers, as buyers, in taking in their contracts on percentage stocks. This rise covered the year both for mills and dealers, but operated against the dealer, whose contracts were placed for the year in that he had to take his stocks at continuous advances while a mill, being bought months in advance, was in on the ground floor. Thus, the rise in cotton became a much more serious factor for the dealer as buyer, than for the mill as seller.

But this does not cover entirely the difficulties of the waste dealer. Consumers of cotton waste were under no such automatic arrangement, and they showed a perfectly natural disinclination to follow prices up unless in urgent need of goods. Consequently dealers, who for whatever reason desired to move their stocks monthly, found the inertia of their clients against them and could sell immediately only at a loss. If, however, they were so circumstanced as to be able to hold over an additional month or two, during which time the consumer's market had become accustomed to higher quotations, and incidentally faced depleted stocks, they could then break even, or make a small profit. One dealer who has done a business not far from a million dollars during the year, claims to have netted only three-quarters of one per cent on the total turnover. This may be an exceptional case, but it affords a clue to the feeling generally held by cotton waste dealers.

Those considerations, while they constitute a fair presentation of the case regarding percentage stocks, do not apply to contracts entered into for other wastes at the beginning of the year at a flat price. Here it would seem that the dealers generally have been placed at no unusual disadvantage and that the rise in the price of cotton actually had been to their advantage.

LARGE ACCUMULATION OF COMBERS

The accumulating stocks of combers is becoming more and more a perplexity. The fact is admitted all around, and no doubt has been an influential factor in inducing the mills to accept lower percentage figures on new contracts. It might almost be thought that the demands for absorbent cotton, into which these stocks go considerably, would have taken care of the surplus. But this has not been the case. And as the mills on fine goods cannot to any appreciable degree decrease the output of comber wastes, it remains to be seen whether, in this present year, any new outlet for these materials can be uncovered.

In this connection it may be noted that the New Bedford mill men have under consideration a project for the institution of some kind of a clearing house which shall handle their wastes more efficiently, and also obviate any direct contact between mills and individual distributors. There is nothing new in this idea. The Merrimack Utilization Co. of Lowell has been doing similar service for mills of that city for some years past. But the comber problem is not so acute in Lowell as in New Bedford, as the latter city is pre-eminently the center for the manufacture of fine cotton fabrics in this country.

LINTERS ACCUMULATE AND DECLINE

Linters, peculiarly the war stock of the market, have run directly against the trend of cotton, closing the year at 5¼c. as against 7¼c. at the opening of the year, and selling last fall as high as 9½c. for best grades. The reason for this seems to be that the supply has over-reached the demand of the manufacturers of gun cotton. In addition, linters have been cut so fine to meet requirements of the munition makers as to render it almost valueless to industries formerly using this material. If the price remains anywhere near present figures, and the staple is not short-cut, the mattress makers may come in again with their usual demands.

The cotton waste business is assuming greater importance each year. The dealers feel that better organization is called for. The incorporation of the American Cotton Waste Exchange, which is expected to take place early this month, will be a step in the right direction.

Hosiery and Transportation

ROSSVILLE, GA., Jan. 8 (*Special*).—In our opinion business in our line will depend quite largely on the question of transportation through the coming year. If that improves as it looks as though it may by Mr. McAdoo's efforts, we see no reason why business in most lines will not continue good. Of course, there will doubtless be some elimination of non-essentials. As to which these will be, and as to what constitutes non-essentials, there will be much controversy. Labor is going to be well employed at good prices, and the Government's requirements will be heavy. Although conditions are without precedent, and will continue to change from day to day, nevertheless business should continue good.

GARNETT ANDREWS.
President, Richmond Hosiery Mills.

CARPET MILLS CHANGE PRODUCT

Many Extraneous Lines Produced by Philadelphia Carpet Plants

Unusual conditions were reported among the carpet mills in Philadelphia as the year 1917 drew to a close. For the last eight months manufacturers have reported business on these lines as extremely unsatisfactory, and many of those in close touch with the situation state in their opinion that the production of the carpet mills in Philadelphia during this period did not reach 40 per cent of normal. Many factors are said to have been responsible for this condition, such as the increased cost of wool, cotton and other raw materials, the difficulty of securing proper help so as to maintain production, with very little interest manifested in carpets and rugs by buyers. As a consequence many manufacturers have experimented with other lines of goods for which their machinery was adapted, and a goodly number have obtained contracts on these goods, chiefly for Government use. Most of the broad looms in this trade are reported to be engaged in the manufacture of blankets; another large percentage of machinery is engaged on duck; while those mills which are making carpets or rugs are operating only a small portion of their equipment, there being very few mills which can report all of their machinery thus engaged at the present time.

MANUFACTURING BLANKETS

In view of the unusual conditions existing, with an effort to ascertain as far as possible the extent of the activities of the Philadelphia carpet mills, and the effect on the production of these goods, the TEXTILE WORLD JOURNAL conducted a thorough investigation among the mills in that city. This investigation showed an interesting state of affairs which must needs have an important bearing upon the carpet and rug trade in the future, should any active demand for these goods arise. Six mills of varying sizes reported they were manufacturing blankets, either directly or indirectly for the Government. This included mills operating from fifteen or twenty up to 125 broad looms. One manufacturer stated they were now operating only 75 per cent of their thirty odd looms, and that 50 per cent of those were engaged on blankets, with the balance on their regular line of carpets and rugs. They had also experimented on duck but had not succeeded in making a satisfactory arrangement for this product. A mill operating about 125 looms also reported at least 50 per cent engaged on blankets which seemed to be about the average situation among these mills, although one manufacturer stated his mill was operating 90 per cent of his 45 looms on this product.

PRODUCING DUCK

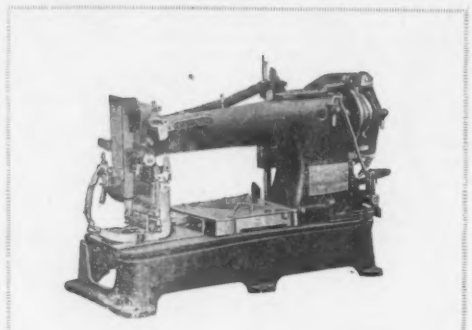
Two mills reported work on duck only for the Government. In one case a manufacturer stated he was running 40 per cent of his 56 looms on duck at present, and only one-third on his regular lines of rugs. He further added that he expected to increase machinery in the near future working on duck, which would cut down still more his production of carpets and rugs. Many manufacturers reported they had conducted experiments on a number of looms in an effort to make either blankets or duck. At least ten manufacturers made this statement. One manufacturer who is operating only one-third of his 40 looms on rugs, stated he had tried to make blankets, but that he

(*Continued on page* 437)

Gentlemen, These Are War Times. Your Duty to Your Business and to Your Country Demands

The Highest Efficiency!

AND such efficiency—we say with all the vigor and earnestness and sincerity at our command—is furnished by the



Rose Label, Tape and Patch Sewing Machine

This machine stands on a proved record of success, second to that of no piece of modern mechanism. It is a proved labor-saver. It is a proved time-saver. It is a proved money-saver. SAVINGS SUCH AS THESE MUST APPEAL TO EVERY HARD-HEADED BUSINESS MAN—to everyone striving for maximum results—the highest efficiency, the most rapid and economical methods.

The Rose machine attaches 1800 labels or patches a day—every day—it never gets tired—never "lays off"—never reports late—never spends half the morning chinning with the girls about last night's "big time." But it is a faithful, conscientious worker—always alert, always open-eyed, always on the job, always reducing overhead, always saving money for the plant. In attaching these 1800 labels or patches—guaranteed (and by the way, one inexperienced girl can turn out three times as much work as an experienced operator on an ordinary sewing machine) the machine sews around all four sides of the label or patch at FULL SPEED—without slowing down at the corners or turning the garment. This is all done automatically—accurately—smoothly—neatly.

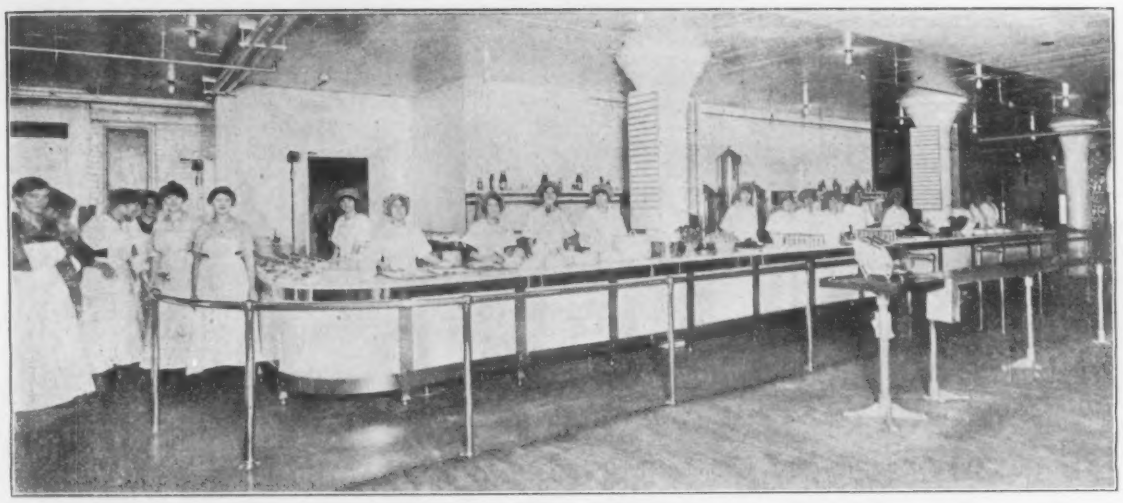
The Kluge Taper Weave Label

enables you to retain your present label, so far as design and proportions are concerned, but makes the size conform to the Rose machine. The combination of Rose machine—together with the Rose Patented Process Patches and the Kluge Taper Weave Labels—furnishes you an ideal way of attaching trademarked labels, distinctive hangers or reinforcements for the buttons and buttonholes on clothing, hosiery, shirts or underwear.

All in all, it makes a mighty interesting story—one that in these times of economy and efficiency—demands the attention of every loyal manufacturer. So why not start 1918 in the right manner—resolve to make the new year a year of economical methods. Get in touch with us—let us send you descriptive literature.

The National Marking Machine Co.

1052 Gilbert Ave. **Cincinnati, O.**



WHOLESOME AND CHEAP FOOD IS SERVED DAILY TO 1500 "MUNSING WEAR" OPERATIVES FROM THIS FACTORY LUNCH COUNTER

Welfare Importance (Szepesi)

(*Continued from page* 116)

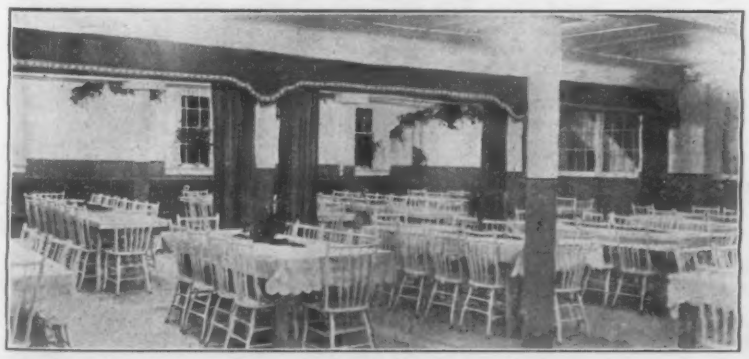
easily served. That this system is suitable for large and small organizations is proved by the Northwestern Knitting Company, of Minneapolis, Minn., where they serve daily over fifteen hundred persons.

To further facilitate quick service, menus are usually posted in the early morning in each department, and, in the majority of cases, the workers have already decided about their choice of meals before they reach the dining-room. In one instance, the menus for the coming day are printed on small slips of paper, handed to every worker in the lunch room, who check the dishes of choice and mark their pay-roll number. At the exit of the room, a box is provided where such luncheon preference slips are deposited by the diners before leaving the room. Thus, the lunch room manager knows the coming day's demand and can make his purchases accordingly.

KITCHEN OF THE NORTHWESTERN KNITTING CO.

SHOULD A FACTORY LUNCH ROOM BE SELF-SUPPORTING?

According to the statements of most mill managers, the factory lunch room is successful only if it is self-supporting. It can be made self-supporting, if proper methods of economy are strictly enforced. In most instances, the mill management also assumes the burden and responsibility for the administration, as in the case of the Nyanza Mills; or the institution is under the charge of a social worker, or, as recently adopted in various plants in the United States, and Great Britain, the lunch room is operated under a committee form of management. By this plan, a committee of four is elected by the workers, representing the various departments of the mill, which committee assumes the responsibility for proper management, economy and service of the dining-room, but of course is under the supervision of the mill manager. Where this plan has been tried out it worked well. First, it relieved the mill management of the drudgery of details. Second, it stimulated interest among workers, increased attendance, and formed a nucleus for a social organization which, as an instrument of good fellowship and co-operation, is a very important factor of mill management. The service of such a committee is without compensation, with the exception of the privilege of free lunch to members. In most factories, light, heat and rent are charged to the institution, but the initial investment is considered as a general mill expense.



NO, THIS IS NOT THE DINING-ROOM OF A COUNTRY CLUB, BUT BELONGS TO THE "DUPLAN GIRLS" OF THE DUPLAN SILK CO., HAZLETON, PA.

The cafeteria system requires few attendants. At the Nyanza Mills, the personnel of the lunch room consists of a chef and three assistants who are capable of preparing all food, do the serving, and keep the place in perfect order. From the factory employes, three women assist as cashiers and distributors of tableware during the noon hour, for which service they receive free lunches.

The Northwestern Knitting Company's institution employs seventeen workers for their fifteen hundred patrons. To this number, during the lunch hours, thirty-eight are added from the factory to assist with the service.

The factory dining-room should not be open all day, but only in the morning and at noon-time, and, in case of night work, at midnight. The Nyanza Mill's dining-room is open only at noon, but they have a lunch wagon sent through the factory early in the morning, selling sandwiches and fruit for workers who have had no breakfast. In every mill there are late comers who, in order to reach their places of work, have taken only a scant breakfast, or none at all. That the efficiency of a person without proper nourishment is far from satisfactory, needs hardly more than a comment. Selling food to workers during working hours from the lunch wagon arrangement may be overdone, and is not easy to control.

QUALITY OF FOOD OFFERED

The quality of food offered should be sufficient, cheap, and well served. However, it is unnecessary to go into the details of strict observance of the science of dietetics, with its determined calories, carbo-hydrates, and proteins. Without going to such extremes, a well-balanced menu can be provided for easily, and the average human tendency to too much starchy substance counteracted by serving generous portions of soups, meats, vegetables, fruit, and puddings at lower prices, and starchy unnourishing meals in smaller portions at higher selling prices.

SAMPLE MENUS

At the Nyanza Mills, the variety of dishes on four consecutive days was divided as follows:

	Soup.	Meat	Fish.	Vegetables.	Desserts.	Fruit.	Beverages.
1st day.....	1	2½	0	2	2	2½	2½
2nd day.....	0	2½	1	2	2	2½	2½
3rd day.....	0	2½	0	2	4	2½	2½
4th day.....	1	0	3	2½	2	2½	2½

The variety of dishes will of course depend greatly on the tastes of the workers.

A NORTHWESTERN KNITTING CO. MENU

The Northwestern Knitting Company offers a menu that in careful selection and variety excels the largest lunch room institutions at prices that are far below the ordinary market value. In spite of the excellence of the food and low cost, this dining room is self-supporting.

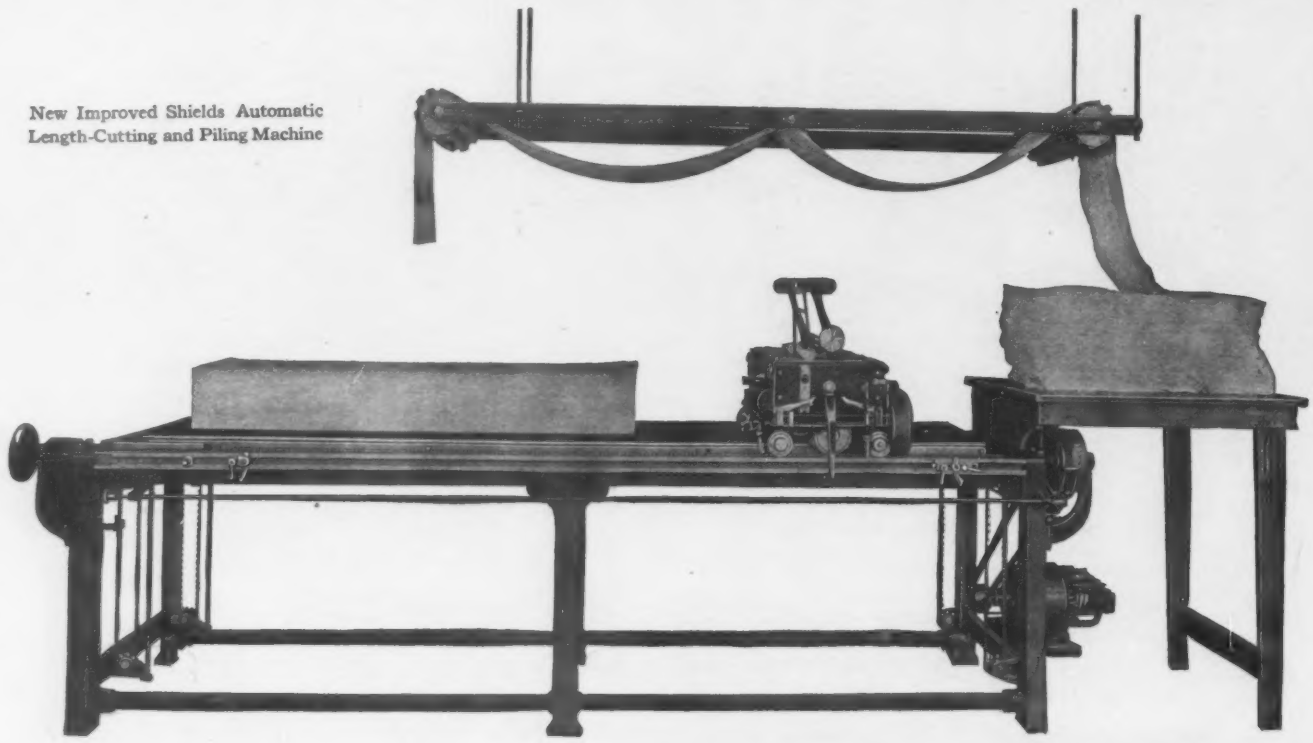
NORTHWESTERN KNITTING COMPANY.

CAFETERIA MENU

DECEMBER 17, 1917.

Eggs to order for breakfast.	
Special for breakfast—2 Wheat Cakes and Sausages, Bacon or Ham, 9c.; to order, 3 minutes.	
Navy Bean Soup	5c.
Six Crackers	1c.
Salted Peanuts	5c.
Dill Pickles	5c.
Special Sirloin Steak	10c.
Special Roast Beef Hash, Mashed Potatoes	7c.
Special Chipped Beef in Cream, Mashed Potatoes	9c.
Special Spanish Beef Stew, Kre-Me-Kuts, Italian Mashed Potatoes	12c.
Special Boiled Knack Wurst, Sauer-kraut, Mashed Potatoes	10c.
Special Fried Liver, Mashed Potatoes, Gravy	9c.
Special Pork Sausage	6c.
Corn Fritter	3c.
Small Syrup	1c.
Baked Pork and Beans	4c.
Mashed Potatoes	3c.
Mashed Squash	4c.
Boiled Cabbage	4c.
Fried Potatoes	4c.
Special Kre-Me-Kuts, Italian	5c.
French Fried Potatoes	5c.
Fried Sweet Potatoes	6c.
One Slice Bran Bread	1½c.
One Slice Raisin Bread	1½c.
Corn Bread	2½c.
Graham Muffins	2½c.
Graham Bread, per slice	1c.
Butter, per chip	1½c.
2 Slices Rye Bread	2½c.
2 Slices White Bread	2½c.
Slice Home Made Toast, Graham	1½c.
Fruit Tablets	5c.
Big Eater Chocolate Bar	5c.
Chocolate Bar	5c.
Lemon Drops	5c.
Hershey's Almond Bar	5 and 10c.
Waneta Bar	5 and 10c.
Cranberry Sauce	5c.
Prunes	5c.
Apple Sauce	5c.
Peach Sauce	5c.
Strawberry Sauce	6c.
Citron Preserves	6c.
Plum Sauce	5c.
Cherry Sauce	6c.
Raspberry Sauce	6c.
1 Doughnut	2c.
Sugared Doughnut	2c.
Cookies, each	1c.
Whipped Cream	5c.
Apple Pie	5c.
Grape Pie	6c.
Sliced Orange	5c.
Cup Cake	2½c.
Baked Apple	—
½ pint bottle Bulgarian Buttermilk	4½c.
½ pint Sweet Milk	4½c.
Sweet Milk, per glass	4c.
Pint Sweet Milk	7c.
Buttermilk, in glass	4c.
Cocoa	5c.
Coffee	2c.
Pot Tea	5c.
Lemonade	4c.
Tutti Frutti Ice Cream	5c.
Vanilla Ice Cream	5c.
Apples	4c.
Apples	6c.

New Improved Shields Automatic Length-Cutting and Piling Machine



The "Ultimate Method" of Handling Knitted Cloth

In a nutshell—our system of handling knitted cloth, now in general use in many of the largest underwear mills, cuts labor to a fraction, practically eliminates seconds and insures perfectly uniform cloth. The

Shields Automatic Machines

have been developed on the *cloth folding principle.* With the old method of rolling the cloth, it is impossible to maintain a uniform width in the cloth, and therefore, the finished garments are not uniform and do not hold their size.

Our system takes the cloth from the Extractor to the Cutting Room without requiring any "hand work" whatsoever. The success already attained by this method has convinced us that it will eventually replace the older methods entirely.

Are *you* enjoying the benefit of producing better garments at a lower cost of production? Why not let us discuss your problems and show you why any of our machines or the whole system will pay for itself in greater profits. Our new Catalog No. 8-17 explains the details clearly. Write for a copy.

"To produce uniform garments you must have uniform cloth"

Some of the Machines We Manufacture

1. Automatic Spreading and Hanging Machine.
2. Extractor Loader Machine.
3. Spreading Machine.
4. Shields Turning and Loading Machine.
5. Shields Steaming, Folding and Calendering Machine.
6. Shields Folding Machine (illustrated below).
7. Automatic Cutting and Piling Machine.
8. Plain Rolling Up Machine.
9. Hot Roll Calendering Machine.
10. Cabinet Drying Systems.

Illustration shows bale tied and ready to be removed.

GRAND RAPIDS TEXTILE MACHINERY COMPANY

Grand Rapids, Michigan, U. S. A.

THE "MUNSING WEAR" BOYS AND GIRLS CAN PRODUCE PERFECT MUSIC AS WELL AS PERFECT UNDERWEAR

The desirability of providing music during lunch room hours has divided opinions. As an entertainment during lunches it is of questionable value. The novelty soon wears off and it becomes a nuisance. In one factory lunch room, however, within the writer's knowledge, the Victrola music is popular and is working overtime in the winter season. In this factory lunch room, at one end of the dininng room, a space of 20 by 20 feet was roped off, and from September until May, twenty-five minutes after noon, the phonograph is started up with the latest selection of dance music. It is almost needless to say that the young element needs little encouragement to take advantage of such an innovation, and dancing is a feature that is justly suspected of playing an important part in securing the young workers for the factory.

The number of industrial dining rooms in the United States is sufficiently imposing to make a careful observer endorse the general statement that of all efforts to foster understanding, personal interest, solidarity between the workers and the management, the lunch room has proved to be the best feature of welfare work. It is probably the one that can be started with least difficulty.

THE SANITARY LOCKER ROOM

Cleanliness and good order are among the industrial virtues upou which all disciplinary features are built. This base of industrial discipline cannot be enforced unless the employes are given the proper facilities to take care of their clothes during working hours. A factory room with its walls littered with clothing serves a bad example, and neatness and the general attitude of the workers is greatly influenced by such minor influences. Lockers where the employes can properly care for their clothes should be in every mill, and where their number is sufficiently large a locker room should be provided. How neat, clean and attractive such a locker room may be made is well illustrated at the California Cotton Mills.

This is what the management of that mill has to say about the locker rooms: "It is of great benefit to give the workers lockers, as it instills tidiness into their habits and prevents the workrooms' being filled up with clothing. Furthermore, it reduces the possibility of theft, in view of the fact that we have a pass key for every locker, and it is understood we have the right to examine the contents of same at any time —which we do."

A WELL ARRANGED, CLEAN LOCKER IS A REAL INSPIRATION OF GOOD ORDER

The Duplan Silk Corporation, of Hazelton, Pa., is another textile mill where this particular requirement of the workers is excellently solved.

THE DUPLAN EMPLOYES' BUILDING

The Duplan Corporation has an employes' building, given over entirely to the comfort of the workers, with locker rooms for the accommodation of over two thousand employes. The grouping of such a great number of lockers in one location may seem to many an inefficient arrangement, but a careful analysis will show the opposite.

Even the staunch suporters of lockers in work rooms admit that their ultimate aim is only partially fulfilled. The space required for lockers often may be better utilized for manufacturing purposes, and if placed in adjacent rooms the control of the workers is apt to be lost.

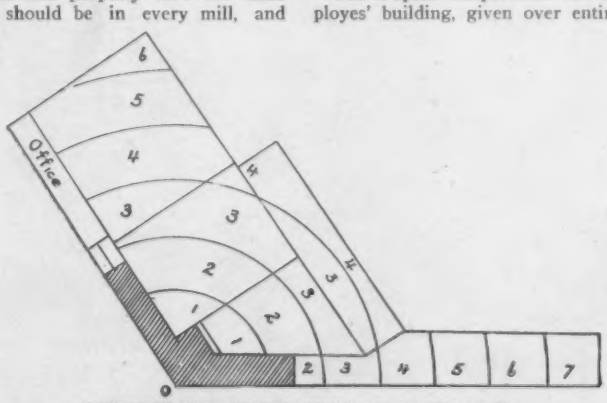
The concentrated locker room overcomes all such objections, but in many instances is found to be the source of confusion when a few hundred employes try to use it at the same time; and this will occur if lockers are assigned in a hap-hazard way without due consideration of the relative distance of the departments from the lockers. Such confusion can be eliminated, as is done at the Duplan Mills, where over two thousand female employes change their clothes in the same room in good order. The secret of such solution is in the proper assignment of lockers.

THE DUPLAN CLUB HOUSE, WHERE THE 1,200 GIRL WORKERS FIND OPPORTUNITY FOR EDUCATION AND RECREATION

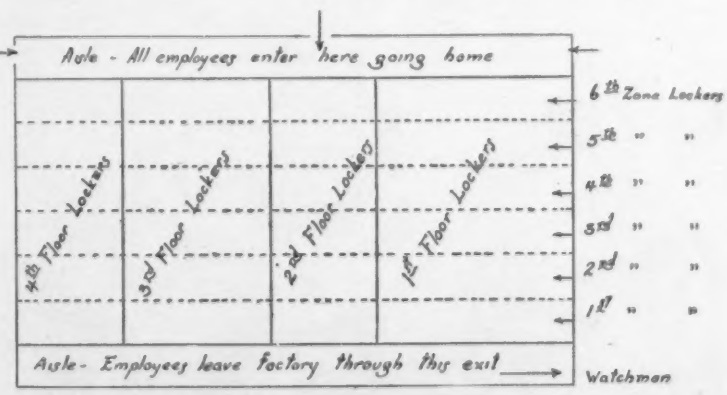
The locker room may be located centrally or at the end of the building. There may be group locations, or one for each floor, or all floors in one location. A group arrangement has recently been installed in the new Fleisher Mills in Philadelphia, while the Duplan Mill presents a good illustration of centralized location. In both instances the solution of the problem is the same.

Using for illustration the Duplan Mill, a rather difficult problem is presented on account of the irregular shape of the plant. As shown in the illustration, the area indicated with shadings is the Employes' Building, and to arrange the lockers in proper relation to the distance from the departments the whole plant is divided into zones, of radii arranged for 24-foot distances. The figures in the illustration represent the relative distances to the centre, dividing the whole plant into zones, which, of course, show the time required to reach the locker room from the various sections of the mill. Whether the mill is a one-story building or six stories, the method of zoning is the same.

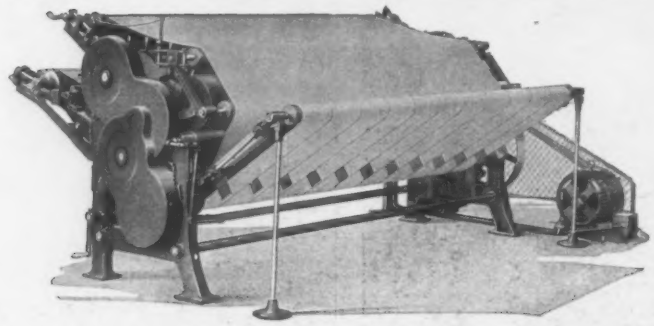
Another illustration shows the locker room of a four-story building divided into four sections in proportion to the number of workers employed on a floor, and the whole locker floor divided horizontally into zones. A well-arranged locker floor has an isolated aisle opening into the factory and one exit to the street, where a watchman can be located, before whom each employe must pass. Employes, of whatever floor, belonging to the first zone, will have their lockers located nearest to the exit approach, while those belonging to the higher zone numbers will have theirs nearest to the aisle leading from the factory. With such arrangements no confusion will



USING THE ZONE SYSTEM FOR LOCKER ASSIGNMENTS



LOCKER ROOM DIVIDED ACCORDING TO THE ZONE SYSTEM, NO JOSTLING, NO RUSH, YET EVERYBODY ACCOMMODATED



American Rotary Hosiery Press

Practical Patriotism!

In these strenuous times, any method or machine that will release one more man for America, is well worth considering.

Take the American Rotary Hosiery Press for example. In one Georgia mill, four men and an American Rotary Press are doing the work that formerly required twelve men. Think what it means to you to cut twelve men off your payroll. One Pennsylvania mill is making a payroll saving of $144.00 a week—over $7400.00 a year.

The American Automatic Underwear Press is a labor saver. One Press has replaced fourteen girls in a Middle Western mill manufacturing sweaters, while in a New York mill, the Press and two girls are handling 80 doz. union suits every ten hour day.

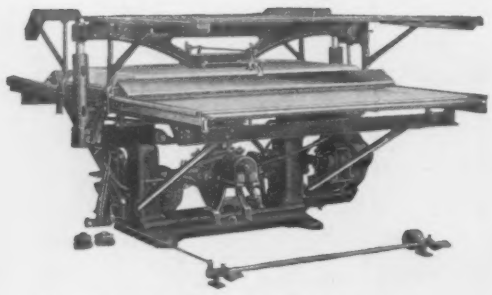
American Hydro Extractors, American Rotary Fulling Machines, the American Automatic Underwear Press, and the American Rotary Hosiery Press are all labor savers.

Write for the facts!

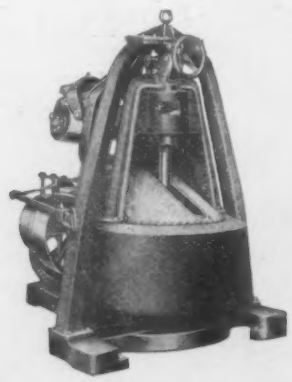
THE AMERICAN LAUNDRY MACHINERY COMPANY

NEW YORK CINCINNATI CHICAGO SAN FRANCISCO

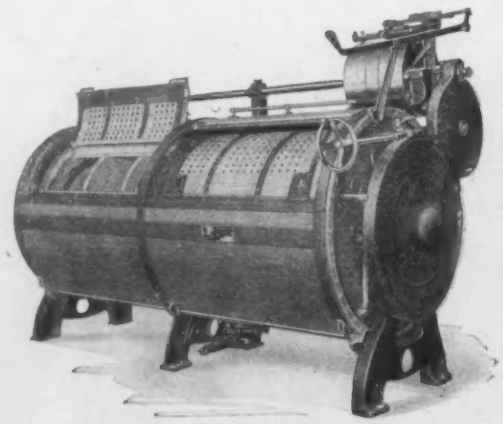
Canadian Factory
The Canadian Laundry Machinery Co., Ltd., 47-79 Sterling Road, Toronto, Ontario
Southern Textile Representative—H. G. Mayer, Realty Building, Charlotte, N. C.



American Automatic Underwear Press



American Hydro Extractor



American Rotary Fulling Machine

ensue, since the users of lockers in the first zone have left the building before those who come from greater distances or from zones of higher number are ready to leave.

The Employes' Building of the Duplan Mills is equipped with a drying room, where in bad weather the clothes of the employes are dried and cleaned during working hours and properly taken care of. Many other mills have such arrangements, and at the Nyanza Mills the workers can borrow umbrellas and rubbers in bad weather, should they be caught without them. The Duplan plant furnishes the women workers with clean and dry stockings, to prevent sickness in cold, damp weather. Such welfare service is called the "Personal Efficiency Group," because it has the tendency to increase the personal efficiency of the workers.

WELFARE VS. LABOR TURNOVER

A few years ago, when one of our manufacturers made the bold statement that the cost of breaking-in a new employe caused at least a fifty-dollar expense to an organization, very few textile establishments had paid great attention to initial causes of their labor turnover. The best worker is the steady one, and he is usually the family man; one who prefers a settled, peaceful existence, a good home, pleasant surroundings and advantages for his children. His state of mind, happiness, and therefore his efficiency, is greatly influenced by the extent to which his ideals are realized. Nor has this much to do with nationalities. Because immigrants are known to have abused American conveniences through ignorance, many managers jumped to the conclusion that modern housing does not pay. Fortunately, this conception did not spread far before the opposite effect was conclusively proved by industrial investigators; not by those of the academic type, but by industrial leaders, who put their theory into practice and demonstrated the truth of their assertions.

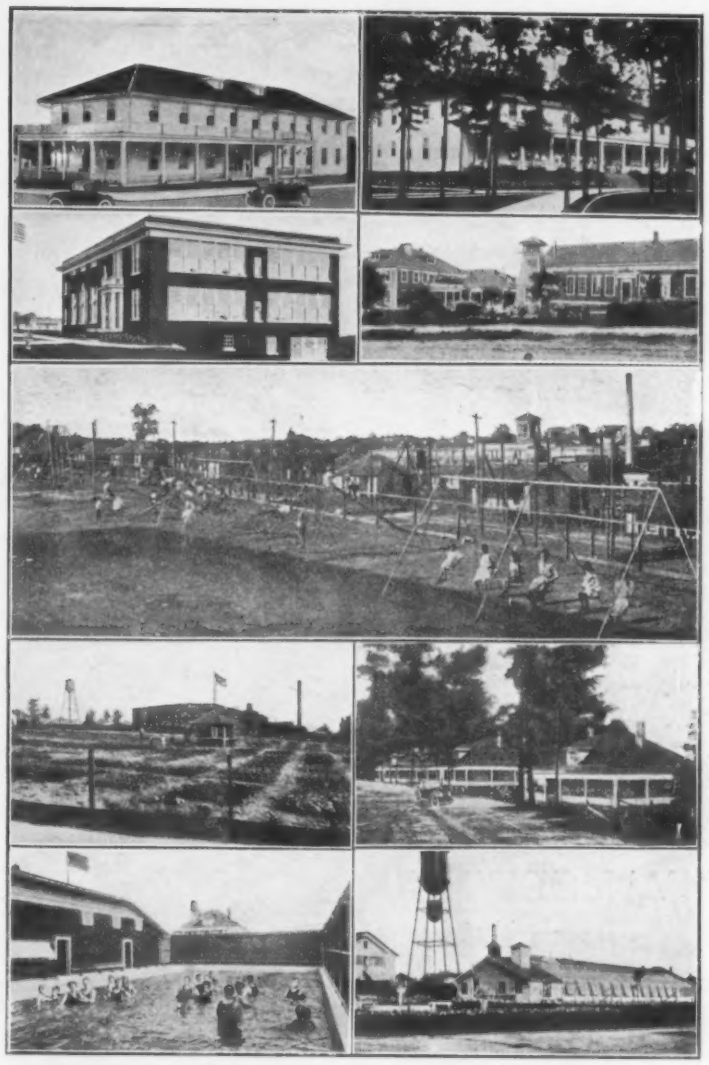
HOUSING CONDITIONS

The modern mill village is becoming more and more a factor for checking labor turn-over. During the last few years, TEXTILE WORLD JOURNAL has described numerous instances of such developments in the textile industry in all parts of the country. For practical demonstration, the mill village of the Connecticut Mills Company, of Danielson, Conn., the Goodyear Cotton Mills, of Killingly, Conn., the American Viscose Company, of Marcus Hook, Pa., are well-known as eastern examples of scientifically planned, satisfactory mill villages.

Southern cotton mills have done admirable work in housing their workers and the mill villages bordering the Callaway group of mills, in La Grange, Ga., serve as a striking example of mill village developments. Modern, well-kept, attractive homes of one, two and three-family houses, well-kept village streets, bridges, parks, lawns, are instruments of welfare work bound to bring results.

FACTORY BOARDING HOUSES

Referring again to the mills at La Grange, Ga., one cannot help being impressed with the Benjamin Franklin Inn, a boarding-house for single men, and the Martha Washington Inn, the boarding-house for independent girl workers. There is no comparison between these institutions, with their home like, well furnished, clean rooms, and at the same time reasonable rates and high moral standards, and with boarding houses of the conventional type. In our eastern industrial centres such boarding houses would prove of exceptional value in attracting the high class, single worker. Since we entered the war a great deal has been said about the possibility of



WELFARE ACTIVITIES OF THE FULLER E. CALLAWAY MILLS, LA GRANGE, GA. HOTELS, SCHOOL, HOSPITAL, PLAYGROUNDS, WAR GARDENS, ETC.

transporting male and female labor to the points of greatest demand. The success of such an undertaking will largely depend on lodging facilities, and mills contemplating such a step will find it worth while to investigate the already existing factory boarding-house institutions and duplicate the best of them.

THE HOUSING PROBLEM

In large communities the housing problem is of another nature. In Lawrence, Mass., the American Woolen Co. a few years ago erected excellent tenement houses for the use of its employes, but such solution is not possible in every instance.

Many mills in larger communities have rented a number of desirable tenements and sub-rented to their employes coming from other cities. They have also started boarding houses, or have a list of investigated lodging houses which they offer their workers.

There is no family man who is not interested in the welfare of his family. Many mills have taken out group life and accident insurance for their workers, and such a step has had considerable effect upon the stability of their labor.

SICK BENEFIT ASSOCIATIONS

This phase of welfare work has not yet reached well-deserved attention. The Northwestern Knitting Co., of Minneapolis, has such an organization, known as the "Employes' Mutual Benefit Association," formed among the employes of the plant, and having a membership of fourteen hundred. This is practically a self-supporting society. The firm launched this enterprise with $1,000, and pays for the salary of the secretary. The dues are 25 cents per month, which is deducted from the pay of the worker. The benefits are $5 a week for six weeks, in case of sickness. This is an effective method of life and accident insurance, and can be extended to meet the requirements of each mill. Such an organization, with a membership of five hundred, can be made self-supporting and form an important link in the welfare institutions of a mill.

MEDICAL SERVICE FOR THE FAMILY

Another form of beneficial mill associations is represented in the Callaway Mills of La Grange, Ga., where for a nominal monthly charge the family of the worker is given medical attention and medicine in case of illness. Mills having at their disposal the services of a physician for the examination of the employes, can, with very little additional expense, add this effective welfare feature to their list.

ENCOURAGING HOME BUYING

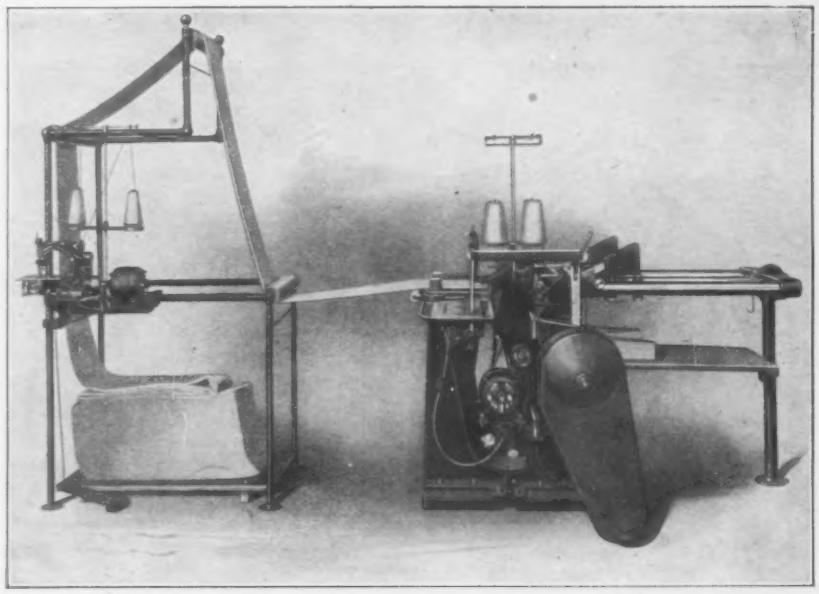
In mill villages organized and kept up by the corporation, the buying of homes by the workers is encouraged with the understanding that, in case of their leaving the service of the company, their real estate is purchased back, at the price already paid in. To help the independent home owner, many mills which financed mill villages have saving and building loan associations, usually with the cooperation of a local bank, and find it a very useful instrument promoting the stability of the worker. A very interesting booklet on this subject has been recently published by the Aberthaw Construction Co., of Boston, Mass., in which the various methods of selling homes to mill employes are fully discussed.

The intelligent worker, who is, of course, the most desirable, insists on proper educational facilities for his children. The writer, during the past year, had opportunity to observe the harmful effect of poor educational facilities

EMPLOYES' PARK AT THE CALIFORNIA COTTON MILLS. NOONTIME SIESTA ON COMFORTABLE BENCHES, UNDER SHADY TREES

THE WEIS AUTOMATIC DESIGN CUTTING AND SEWING MACHINE

does the **work** of **ten people** and



produces
Sleeves and Drawers
from

ROLLS

ONE INCH

NARROWER

than heretofore
required

METROPOLITAN SEWING MACHINE CORPORATION
NYACK, NEW YORK

PARAMOUNT DRYING AND SHAPING FORM ANNOUNCEMENT

OUR PATENTS

This form, and apparatus, and the method employed in connection therewith, are covered by the following United States Letters-Patent Nos. 1,114,966, dated October 27, 1914; 1,166,947, dated January 4, 1916; 1,204,945, dated November 14, 1916, and 1,207,494, 1,207,495 and 1,207,496, dated December 5, 1916; 1,218,520, dated March 6, 1917; 1,235,534, dated July 31, 1917, and also by Canadian patent No. 167,851, dated February, 29, 1916, owned by *Paramount Hosiery Form Drying Co. Other patents* pending.

HAVING arranged for greatly increased manufacturing facilities for "Paramount Equipment" by the erection of the additional factory now nearing completion, already announced, we are at last in a position to expand our business so that manufacturers may have the option of any of the three following plans, whichever may be most advantageous to their business:

FIRST: The payment of 50c per 100 dozen for Seamless Cotton Hosiery, in accordance with the present terms of our contract.

SECOND: A flat rental of 35c per form per month for drying Seamless Cotton, Wool or Silk Hosiery, and 50c per form per month for our patent Center Groove forms for Full Fashioned Hosiery.

THIRD: To sell the forms to manufacturers on the following basis:

	Each.
Ladies' Full Fashioned Center Groove	$21.00
Ladies' Full Fashioned Center Groove Outsize	$23.00
Ladies' Seamless Toe Positioning Groove	$19.00
Ladies' Seamless Toe Positioning Groove Outsize	$21.00
Children's Ribbed Hose Toe Positioning Groove	$18.00
Men's Half Hose Toe Positioning Groove	$16.00
Men's Half Hose Full Fashioned Center Groove	$18.00
Infants' Half Hose Toe Positioning Groove	$15.00

Our patented "Paramount Forms" and "Paramount Method" insure proper shaping of your hosiery, which may be the determining factor in your success. Paramount Forms have revolutionized conditions in hosiery mill finishing departments, simplifying the work and giving them the greatest efficiency and economy, as the largest and most representative hosiery manufacturers in this country can testify.

Paramount service goes with Paramount Forms

PARAMOUNT HOSIERY FORM DRYING CO.,
HUNTER BUILDING, MARKET AND MADISON STREETS - - - - - CHICAGO, ILL.

THE "DUPLAN GIRLS" ON THEIR FIELD DAY SHOW THAT THEY ARE JUST AS EFFICIENT IN DISTANCE RUNNING, AS IN WEAVING BROAD SILK

in a mill, with the result that the oldest and most dependable workers gradually moved into the nearest town where good schools were offered to their children. Finally, this mill has decided to start a bus service for the children of the employes who attended the schools of the nearby town, and the result to the mill was entirely satisfactory. Many valuable workers were induced the following season to resume their work at the factory, owing to the inauguration of the bus system.

FINANCIAL INDUCEMENTS

Bonus and rewards are too well known to need introduction. They may be based on production, on attendance, or on length of service, depending upon the conditions at the mill. Strictly speaking, it is a welfare institution and belongs to this group. They may be paid in cash, in mill stock, or in Liberty Bonds.

SOLIDARITY OF THE WORKER

Last summer the writer traveled from a small industrial town, where a number of textile mills are located, with a group of men returning to their homes from the various mills. Their conversation was illuminating. One group spoke about "the shop," "the boss," their small personal grievances, and the expression of their opinions was far from complimentary to the organization. The other group spoke about "our mill," "our manager," and were discussing the coming organization banquet.

The first group represented workers to whom the mill was only a place to earn their livelihood, while to the latter it was an institution of equal value and importance to their home or to their church. Both mills are well known to the writer. The wages paid are about the same; the difference is that the first group is considered by the management as individual workers, with no other tie than productive performance, while the latter mill is well known for its welfare work and for its systematic campaign for promoting organization, pride and solidarity among its workers. This important phase of welfare has been unduly neglected because of lack of proper leadership, and many mills have found it worth while to attach a social worker to their staff, whose exclusive business is to form the connecting link between employer and employe.

The Northwestern Knitting Company is one of the textile mills where this "pull-together" spirit has been carried to the highest perfection, and no words can better illustrate the result of the movement that the statement of C. L. Pillsbury, the treasurer of the company:

"It was in the early days of the plant that the cordial relation between employer and employe crystallized in the idea which has become a part of the organization; that is, that this is the 'Munsingwear Family' and each employe a loyal 'Munsingite.' Since the rapid growth of the industry has made it impossible for officials of the company to have a personal acquaintance with the employes, an industrial secretary was appointed and a service department created—to act as a medium between employer and employe."

THE FACTORY ORGAN

There is no better medium for promoting organization pride, and interest in the mill, than a well-edited, lively factory magazine. "The Munsingwear News" is published by the Northwestern Knitting Company and is ideal for the purpose. "The Duplan Tattler," published by the Duplan Silk Corporation, of Hazelton, Pa., is another example of what a factory organ should be. This latter publication carries fourteen pages of advertisements from local dealers, showing how such publications can be made self-supporting.

TUG OF WAR; DUPLAN FIELD DAY; WHEN GIRLS ARE TAUGHT HOW TO PLAY. GIVE THEM A LEADER AND THEY DO THE REST

EXECUTIVE SUPPERS

For the promotion of good fellowship in many organizations the foremen of the departments meet once a month at the supper table, under the leadership of the plant manager, where various problems of the mill are discussed. Many imaginary ills, groundless jealousies, and budding malice can be avoided through such executive suppers, where men free from care and responsibility have a chance to get better acquainted and find something worth while in each other.

Executive heads who otherwise have no opportunity of meeting their department heads have found this an advantageous and excellent means of personal intercourse, with results that could not help but have a lasting beneficial influence on the management of the mill.

ANNUAL PICNICS

This is a well-known and very desirable form of welfare work. Here again the Northwestern Knitting Company may be cited as an example. Their picnics are affairs for which their employes plan for months in pleasant expectation. It is a wonderful and effective welfare organization and has been adopted by large numbers of textile mills. No organization is too small or too big for such an event, where the president of the company has a chance to rub elbows with the last card tender, who, in turn, learns that the former is really a human being, with human qualities which the latter never dreamed he possessed.

When the army of workers has a chance once a year, to find their foremen and managers cultivating good fellowship without restriction, such events will live in the memory of the average human being for the rest of the year and cement relations between employer and employe strong enough to have the words "LOYALTY TO THE MILL" spelled in capital letters.

THE "MUNSINGWEAR GIRLS" AT THEIR PICNIC. A FINE LOT OF WOMEN WORKERS, THE JUST PRIDE OF ANY ORGANIZATION

WORKERS' COMMITTEES

An illustration that welfare must not in every instance be an expensive and elaborate institution may be related with the following actual happening: In a woolen mill, all methods and ways of enforcing discipline, good order, and safety measures had failed. When all means of ordinary management had been exhausted, the mill decided to call the workers together and let them appoint a committee of three, selected by the workers in each department, to enforce safety, discipline, cleanliness and good order. The foremen of the respective departments were the heads of the committees who met the manager of the plant once a week to discuss the various means of improving these problems. The very fact that the management had called the workers into a conference to carry out the new measures, changed the attitude of the employes, and where a few months ago the most elementary rules could not be enforced, now the most far-reaching improvements and disciplinary measures were put into operation. To-day this mill has the enviable reputation of possessing a loyal organization.

This exhausts the usual welfare and organization methods, with the exception of club and recreation rooms, or the Y. M. C. A. service, which from actual experience has been found to be a very important factor of welfare work, especially for attracting the young working element to the mill. What has been done in the textile industry can be well illustrated by the new club house of the Duplan Silk Corporation.

This mill is located in the coal belt of Pennsylvania, employing mostly girls representing a conglomeration of nationalities, whose parents are employed in the surrounding mines. Two years ago the management decided to erect a club house for the exclusive use of the "Duplan girls."

DUPLAN CLUB HOUSE

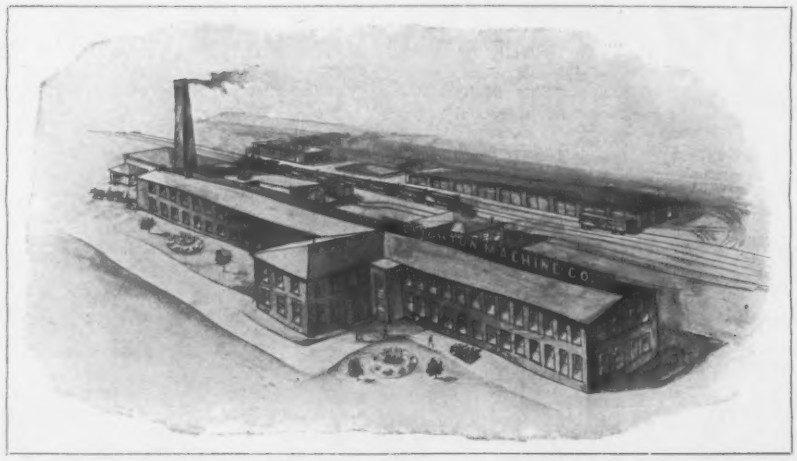
This club house was opened last year. Its equipment and furnishings rival many country clubs of the vicinity. In construction and equipment care has been taken to use simple and inexpensive material, the initial cost of which are within the means of the factory worker and demonstrate how comfortably and tastefully cheap furnishings may be selected and arranged for homes of moderate circumstances.

THE "DUPLAN CLUB" IS FURNISHED INEXPENSIVELY, BUT TASTEFULLY

THE LEIGHTON CIRCULAR RIB KNITTING MACHINE

Is built on a PRINCIPLE which produces
MORE YARDS OF PERFECT GOODS
From the same amount of soft or uneven yarn
THAN ANY OTHER

Perfect Racked Edges and Fancy Stitches are made Automatically on the LEIGHTON
It's the Right Principle



Plated Fabrics In All Grades For the Underwear and Sweater Trade Easily Produced By Using the LEIGHTON

LEIGHTON MACHINE CO., MANCHESTER, N. H.

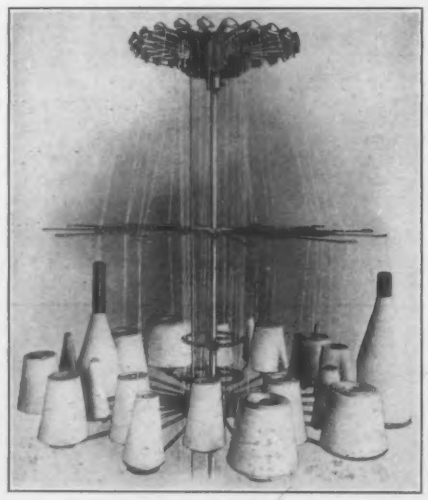
CRAWFORD STOP MOTIONS

For All Makes and Sizes of Circular Rib Knitting Machines

TYPE D-HEAD—
Long and Short Arms

TYPE H-HEAD—
All Short Arms

All Bright Parts Nickeled



In ordering state whether for
Regular Underwear Weight
of yarn,
Sweater or Heavy Yarn
or
Fibre Silk

Ask about our new head with individual regulation

For years the Crawford Stop Motion has been the recognized and efficient stop motion for knitting machines
Over 25,500 sold and customers say they pay for themselves in a few months

CRAWFORD MANUFACTURING COMPANY
New Brunswick, N. J.

The club house can accommodate twelve hundred workers, and at present there is no day when some kind of social activity is not carried on within its walls. It is a two-story and basement building of the bungalow type. In the basement they have a modern kitchen, with a domestic science school equipment in charge of a high school teacher, where the girls may receive instruction in cooking and housekeeping. Lessons are given twice a week and the kitchen is connected with the dining room, where once a month the various guilds, formed among the girls, arrange social suppers to which outsiders are invited. They have also a gymnasium and a large swimming pool, both in charge of a physical culture teacher who teaches physical culture, games and dancing six hours a week.

The office of the secretary and her two assistants, a smaller social room, a large reception room with a piano and talking machine, a private library of five hundred books, also a large assembly room with stage holding over one thousand people, are located on the first floor. The top floor has a gallery for the assembly room, a sewing room with modern equipment where four hours a week lessons are given in dressmaking, knitting; a dark room for photography, where two hours a week opportunity is given for those who are interested in this art, and, finally, in an extension of the main floor, they have a conservatory where instructions are given on the proper care of home plants and gardening.

The Northwestern Knitting Co. has a large recreation room for the social gathering of its mill workers.

It has been recognized as an inevitable fact that the average small town offers very meager opportunities for healthy recreation and social life for the young workers. In many communities the constant efflux of the young working element is witnessed with alarm by the managers of the mills, and investigations have followed to determine the cause of this action. As a result of these investigations, recreation or club rooms in factories, with opportunities for physical, social, and educational activities, opened to this element with satisfactory results, and this feature can be considered a standard welfare practice employed in textile communities. Among the southern cotton mills, the Y. M. C. A. branches answer admirably for the purpose, and their work deserves well-earned credit.

Many textile mills have found it desirable to have such social service for the young people connected with their management and organization. Physical attractions, like gymnasium, swimming pool, basket ball, bowling and dancing appeal to both sexes, and their patronage demonstrates that the pool room of the small town, with its questionable entertainment and decidedly harmful moral influence, is patronized only for lack of more desirable institutions. Even mills without club facilities can do a great deal by equipping an athletic field near the factory and encouraging organized athletics among their employes.

Today, it is not surprising to see during the summer time, in front of a cotton mill, the boys and girls playing tennis during the lunch hour, nor is the pigskin and unfamiliar sight in the fall. Baseball clubs can be made a strong drawing card. Last year the baseball club of the Nyanza Mills, Woonsocket, R. I., won the inter-city championship. The recreative, character-forming, and healthful value of physical exercise needs no introduction, and such welfare work will not only increase personal efficiency, but assist in developing the highest type of manhood and womanhood, which, in future years, will prove to be the pillars of American industry.

THIS IS THE RECREATION ROOM FOR THE MAKERS OF "MUNSING WEAR." IF APPEARANCE COUNTS, YOU MAY JUDGE THE APPEARANCE, PRIDE AND PERSONAL EFFICIENCY OF THE WORKERS BY THE HOUSE THEY FREQUENT

CAMPING GROUNDS

Several mills, during the last few years, have rented camping grounds in desirable spots for their employes, where those desiring to take advantage could find well-equipped camps under the leadership of a trained person. One northern mill has engaged for the summer time a man and a woman teacher of the local high school to take charge of the men's and women's camps respectively. They have also furnished a cook, and the cost of camping was low enough to appeal even to the lowest paid young workers whose parents have the assurance that their physical and moral welfare is well taken care of.

SOCIAL ORGANIZATIONS

Orchestras, glee clubs, dramatic societies, guild organizations, have been successfully introduced in a number of mills, quoting as examples the Duplan Club and the Northwestern Knitting Co. Entertainments organized among the workers under competent leadership are bound to foster solidarity. The glee club suppers of the Duplan organization have become an institution, and during the past year the dramatic club, organized among the employes of the Northwestern Knitting Co., produced musical and minstrel shows that would do credit to professions; another concrete fact showing that an industrial organization can be interwoven with social ties that will make a mill a solid unity from the head of the management to the last worker.

VACATION CLUBS

Several mills have started vacation clubs, where the workers contribute a certain amount every week and the mill secures through the various traveling bureaus reduced rate tickets for a week's vacation. Such welfare work requires very little financial aid, but some attention. It is well known to everybody that such excursions, when arranged for a half-dozen or more, can be secured for almost half the price, and the management's attention cannot help but be appreciated by the workers who wish to see the country during vacation time. In one mill, instead of a bonus, prizes have been given for vacation travel to the operatives with the best performance and record of the year in each department. This idea makes its strongest appeal to workers in mills located in the cities.

EDUCATIONAL FACILITIES

The Duplan Club has a library of five hundred books. In larger communities arrangements can be made with local libraries to extend their service and foster education among the workers. Other educational features which have proved successful in welfare work are as follows: Evening classes in industrial subjects, open for ambitious workers to perfect themselves in their respective branches. Furthermore, English and Literature, Domestic Science, Sewing, Hygiene.

EMPLOYES' REST ROOM AT THE CALIFORNIA COTTON MILLS

Photography and floriculture were arranged at the Duplan Club. The program for the year is excellent and interesting for those who are contemplating such improvements:

PROGRAM

Monday: 7.15-8.45, cooking; 7.15-8.15, plain sewing; 8.15-9.15, knitting or crocheting; 7.30-10.00, photography; 9.00-10.00, home nursing; 7.30-8.15, 8.15-9.00, swimming; 7.30-8.15, 8.15-9.00, physical culture and games; 9.00-10.00, gymnasium games and dancing.

Tuesday: 7.15-8.45, cooking, 7.15-8.15, plain sewing; 8.15-9.15, knitting or crocheting; 8.15-9.15, English; 7.30-10.00, photography; 7.30-8.15, 8.15-9.00, swimming; 7.30-8.15, 8.15-9.00, physical culture and games; 9.00-10.00 gymnasium games and dancing.

Thursday: Open for all who care to come to swim, play, dance, print pictures, practice, etc. First aid.

Friday: Closed except by special arrangement.

Club House closed regularly Wednesday and Saturday evenings except for public games, entertainments or joint Social affairs. Closed also on Friday evenings except for Gild parties or by special arrangement with the Secretary.

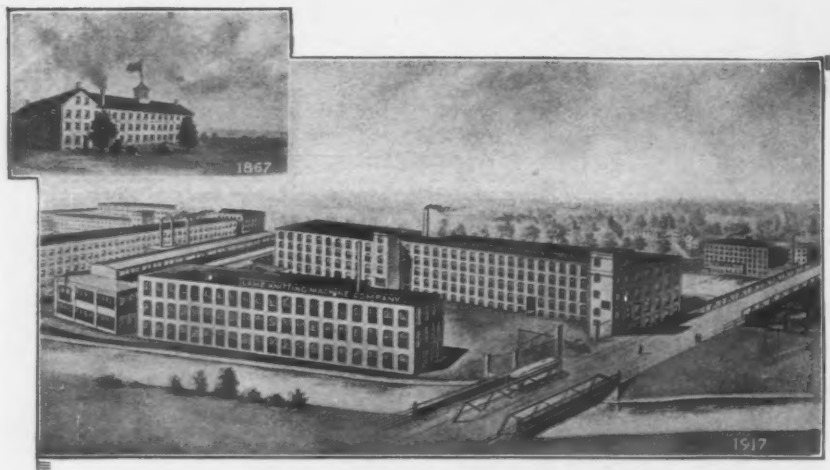
Dances among the mill employes can be easily arranged, especially where the dining room service is installed. One mill having a club room has made arrangements with two of the large stores of the nearby town to arrange fashion shows twice a year. Of course, these are well attended by women of all ages.

Dramatic and musical entertainments are usually successful, and moving pictures have gradually commenced to play an important industrial and educational part.

The Eagle Silk Company has under preparation at the present time moving pictures for teaching their operatives the best methods of performing operations. Similar work was undertaken by Belding Brothers, with pronounced success. Such pictures, besides having educational value, can be made entertaining and have an important influence on an organization.

The coming year will see an even greater impetus to this movement, and it is hoped that workers will realize that the opportunities in our industry are equal, if not greater than those in others and offer besides a very decided advantage—stability.

"PLAY BALL," SAY THE MEN WHO STAY YOUNG. ALL THOSE IN VIEW ARE FELLOW WORKERS IN THE FACTORY, AND PROUD OF IT



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- Drop Needle Machine.
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of Progress and Service

have given Lamb Knitting Machines a reputation which is world-wide.

Our present large and highly efficient organization is evidence of the satisfaction these machines have given.

From the very first hand-driven machine down to the latest Lamb Full Automatic, our standards of quality and workmanship have been of the highest.

The name "LAMB" on a machine means "best." Made of the finest materials with the best tools, these machines stand the severest kind of wear. They are simple in design, accessible and absolutely accurate.

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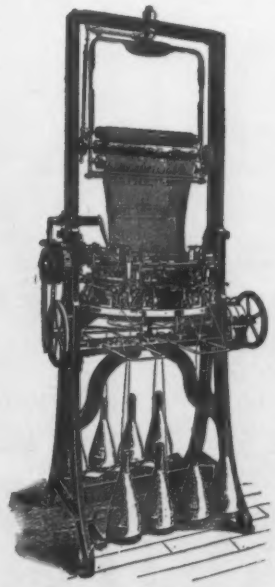

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Automatic Rib Cutting and
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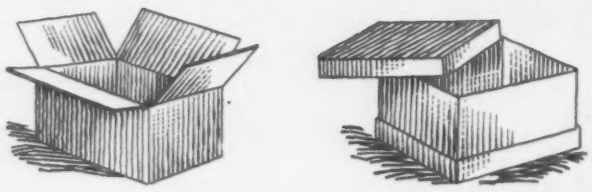

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H & D Corrugated Fibre Board makes the lightest and best dress goods boards.

No sawing, nailing or litter in the packing room. No freightage to pay on heavy boxes. H & D boxes come to you folded flat, saving 90% of your storage room. Only a moment's work to set them up.

Send specifications and get free sample
Write for "How to Pack It"

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ROLLERS

Experience has taught you that it pays to buy the *best* in rollers

Our rolls represent the utmost in economical service, because we don't undertake to furnish rolls unless we know for what purpose.

Then we guarantee them—and we live up to the guarantee.

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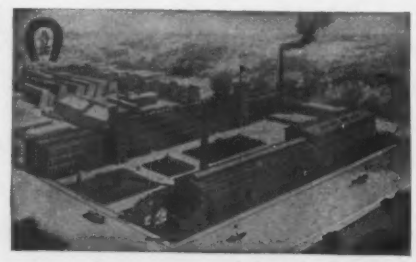

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Hosiery and Textile Binder

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There is one that binds heavy carpet samples or light silks—another to take the place of pins or clips. Whatever your purpose, there is an Acme that will fit it more economically than any other device. Special models made for special requirements. Write for time-saving information.

A Simple, Inexpensive Machine for **Attaching Tickets** on **Hosiery, Underwear,** etc.

It uses a pointed staple, **CANNOT INJURE THE FINEST SILK HOSE;** can be set aside when not in use.

Is operated by foot power and has a **patented WORK-HOLDING DEVICE carrying one dozen or more pairs of hose, keeping them in perfect alignment and presenting the tops in position to receive the tickets AT LEAST TWENTY-FIVE PER CENT. QUICKER** than by any other method now in use.

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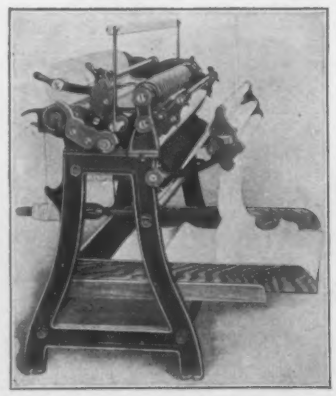

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Cuts Cotton or Woolen Fabrics, Knit Goods, etc., for Bindings, Facings, Fronts, Button Stays, etc. **Straight or Bias.**

This machine saves 6% to 15% in cloth; 25% to 50% in labor over the old methods.

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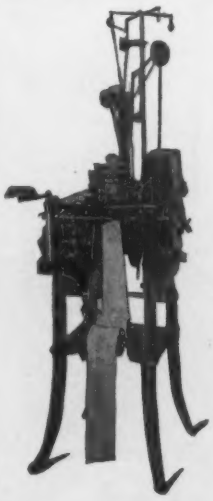

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MORE product with fewer seconds, less repair bills, last through longer service and

EARN bigger profits for their owners.

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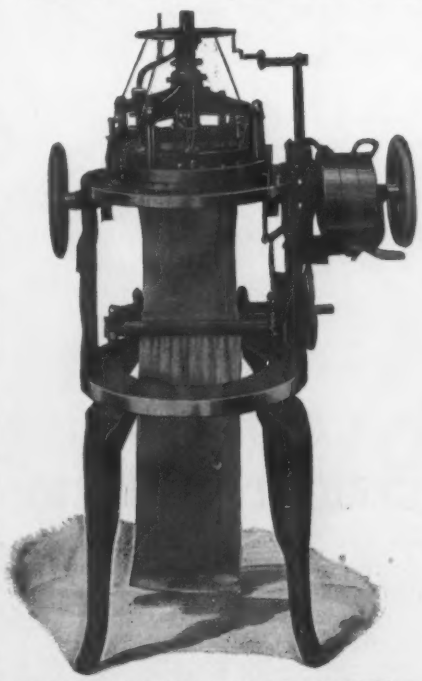

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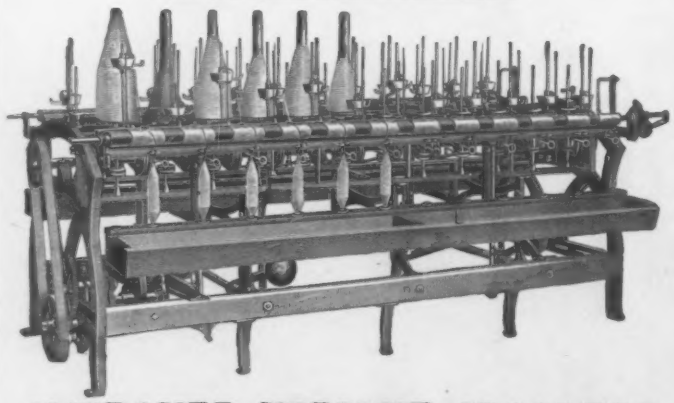

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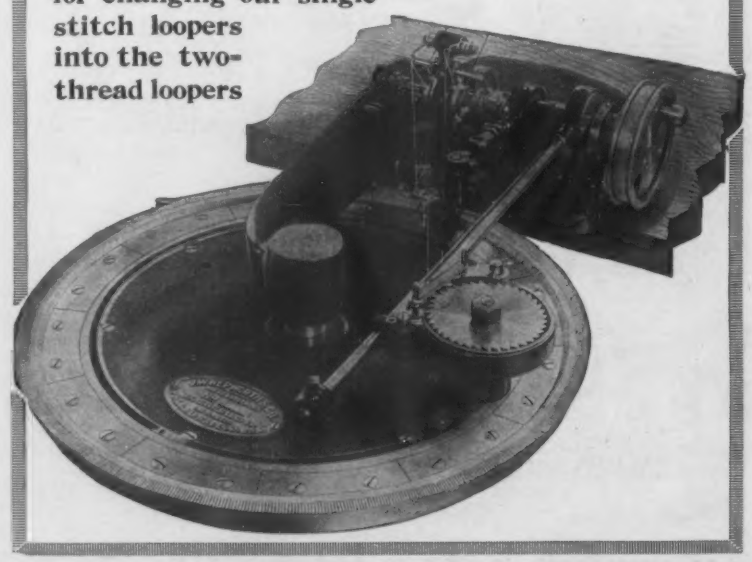

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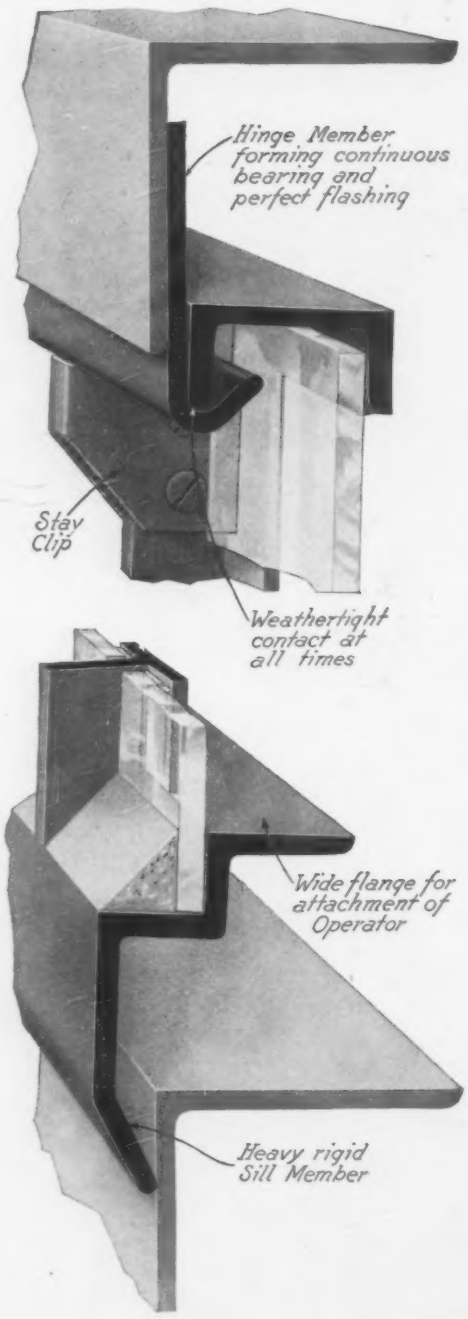
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Stay Clip
Weathertight contact at all times
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Many distinctive improvements and exclusive features assure the leadership of Truscon Continuous Sash, already successfully used in important installations.

All hinges for supporting the sash are eliminated. Instead, there is a continuous, uniform bearing along the entire top member of the sash. This uniform bearing provides a continuous support for the entire sash. No undue strains are concentrated at widely separated hinges, tending to distort the sash.

Moreover, the sash, whether opened or closed, is absolutely weathertight at the top. There is no place for rain or snow to enter. This simple uniform bearing also facilitates the operation of the sash.

Truscon CONTINUOUS STEEL SASH

Another feature is the heavy, rigid sill member with its weather-tight contact and wide flange for attachment of operator. The "T"-shaped vertical members of the sash are mortised and tenoned to top and sill members, and joints are welded into a solid unit by the oxy-acetylene process.

Perfect weathering at the ends of the rows of continuous sash is obtained by the combinations of fixed and storm panels. Our Improved Truscon Operator has great power, assuring ease of operation with perfect control of the sash.

For monitors, sawtooth roofs and similar uses, Truscon Continuous Sash are setting a new standard in design and construction.

Write for Continuous Sash Catalog and estimate

KAHN Building Products

TRUSSED CONCRETE STEEL COMPANY

Steel Sash Dept. 17 · · YOUNGSTOWN, OHIO

KAHN Building Products

Representatives in Principal Cities

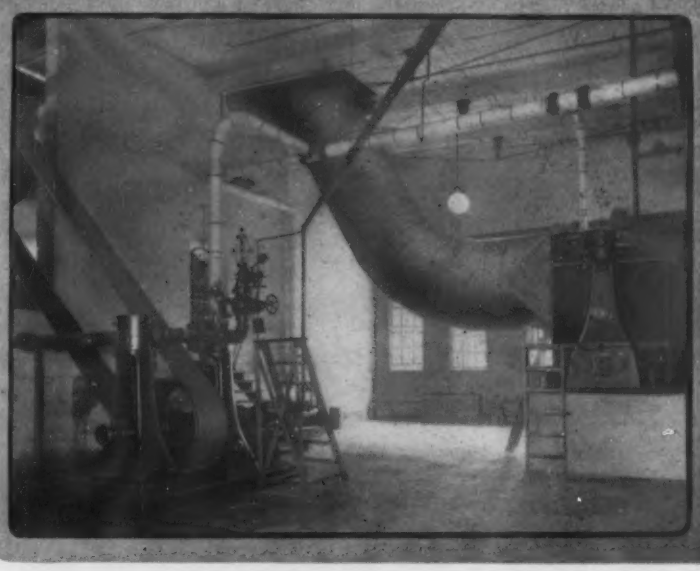
RIVER RAISIN PAPER CO., MONROE, MICH.

Sirocco Products Solved Their Problem

In the paper forming room of this Company, one of the largest in the world, uniform temperature is a necessity. When making a recent addition to their plant this Company installed 4 more complete "ABC" engine driven Fans and Heater Units. The illustration below shows one of the four 11 x 8 A Engines and No. 12 Sirocco Fans.

You can save money by increasing the efficiency and health of your employees.

Let our Engineers demonstrate to you how to handle your particular industrial heating and ventilating problem.



Our publication No. 27027, "The Comfortable Shop for Efficiency," will interest every manufacturer. Free on request.

AMERICAN BLOWER CO.
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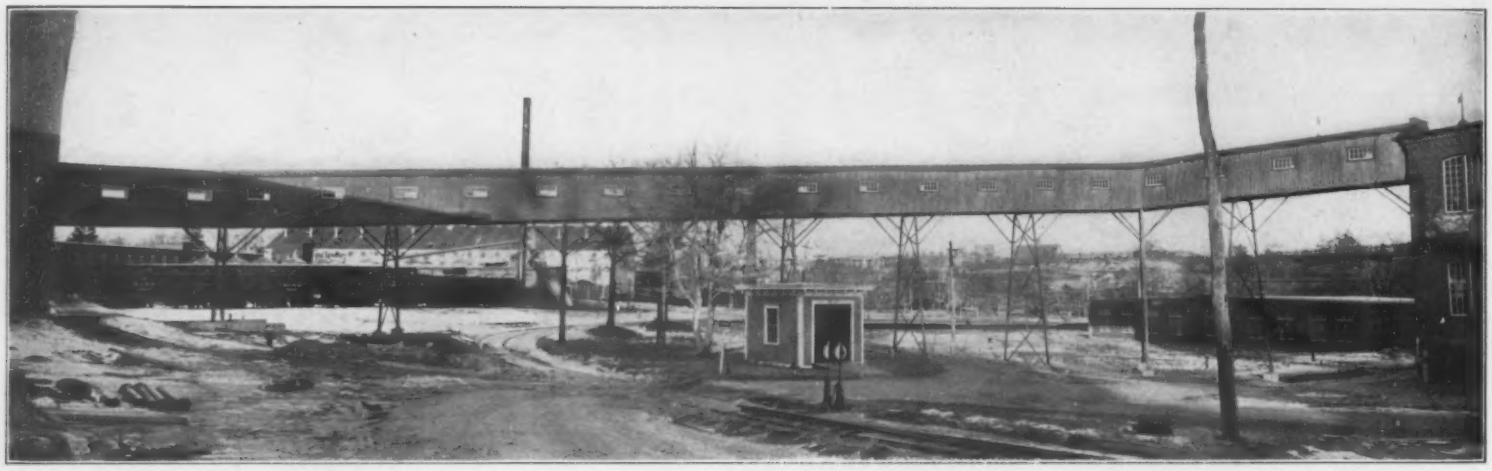
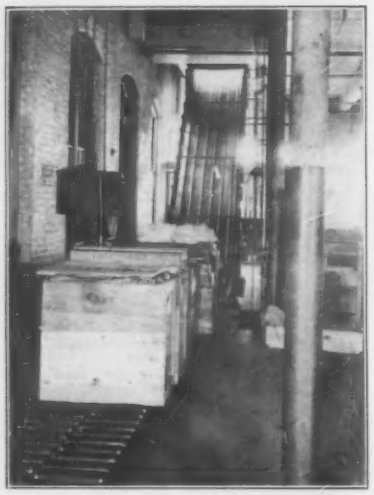
Windsor, Ontario

Branches in all Large Cities





Conserve Man-Power

Let Gravity Work for You

Gravity will do the work of many men in your mill—and do it better, more efficiently and more dependably.

Mathews Modern Gravity Conveyers

will handle and route your raw and finished products from the stock room to shipping room.

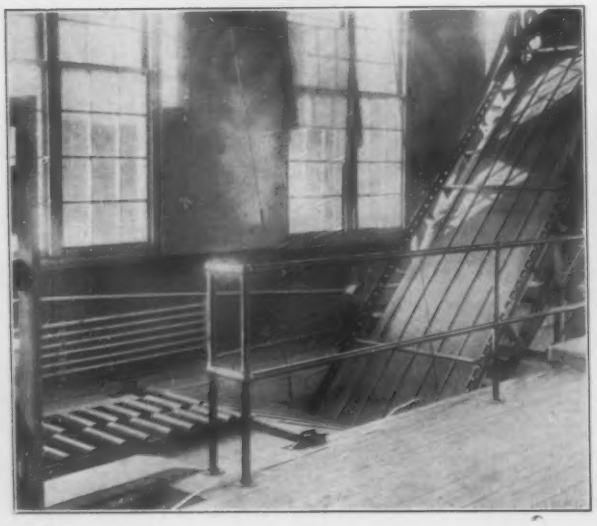
The photographs on this page show one of our gravity conveyer systems in use in the Sayles Bleacheries, Saylesville, R. I., where it handles efficiently an output of from sixty to seventy tons per day.

The best modern trucking system cannot compete with MATHEWS labor and time-saving devices.

Put Your Problem Up to Us

MATHEWS GRAVITY CONVEYER is adaptable to your needs. We supply simple short runs of portable roller units or design complete handling systems involving combinations of gravity and power equipment.

The Mathews Way—The Saving Way



MATHEWS GRAVITY CARRIER COMPANY

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ELLWOOD CITY, PA.

Branch Factories
TORONTO, ONTARIO
LONDON, ENGLAND

Motor Trucks in the Textile Industry

Experiences of Representative Mills—Cost as Compared with Horse-Drawn Trucks—Trailers

By *Samuel Sayward*

"BEAR in mind two points if you would make hauling by motor trucks profitable. First, keep the wheels moving. Second, carry a load both going and coming."

This statement by the agent of a Massachusetts textile factory which is filling a Government contract said to run into eight figures and who, because of stringent orders issued by his company relating to the giving out of any information during war times, prefers to be known as "Somebody in Massachusetts," tells in a nutshell why most agents are enthusiastic over motor trucks, but also why you sometimes hear a mill agent, a transportation manager, or a shipping agent declare that motor trucks are more expensive than horses.

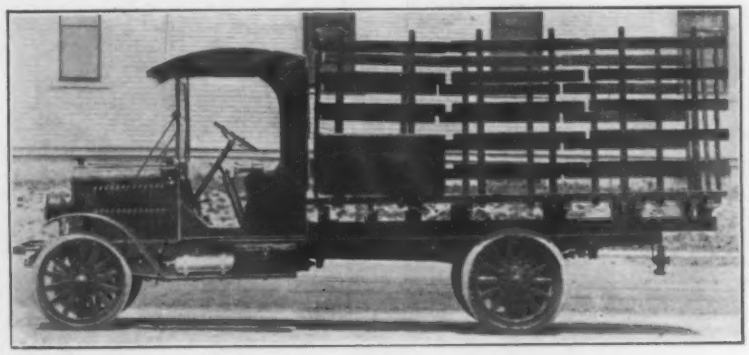
Hauling freight by motor trucks is still in its infancy, although it is a pretty husky infant and is growing by leaps and bounds. So long as the supply of motor trucks holds out, and so long as railroad congestion is periodically threatened, the popularity of the motor trucks is bound to increase. The experimental stage, so far as mechanism and repairing of trucks is concerned, is now past. The experimental stage, so far as motive power is concerned, whether it be gasoline, steam, electricity or some fuel which may be invented to meet abnormal conditions, is still with us.

The motors are no longer engines of mystery to the average machinist. Most of the machinists at the present time have an automobile of their own. They have studied it and overhauled it at leisure. But to have any mill statistician agree with another regarding the most economical cost of operation of the three classes of trucks in all respects, is out of the question. The gasoline truck has its supporters. The electrically propelled truck, while not so common in many sections of the country, is doing work so economically that in every factory where it is feasible to operate its own charging station, strong supporters of this type of truck exist. The steam-driven truck has features to recommend it which neither the gasoline nor electric trucks contain. All three have their friends who will rally to their support whenever an argument is started over the merits of power.

TRUCK SHOULD SUIT CONDITIONS

Different conditions confront every purchaser of a truck. Every mill presents different problems to be solved. Every truck has a different duty to perform. Therefore it remains for the superintendent, or the shipper, or the efficiency expert to determine which type is best adapted to the company's needs. In all probability he will decide upon several different types of car, each type being best adapted to the particular work in view. To a wise selection depends much of the success in the operation of motor trucks at that plant.

Ten years ago motor trucks were looked upon more or less as a curiosity. Today they are practically on a par with the pleasure automobile in attracting the attention and holding the interest of business men. In selecting an automobile for his own and his family's uses, a business man has certain well defined ideas as to what kind of car will best fit his uses and his pocketbook. He should have even better defined ideas of the kind of a truck he needs and not leave the selection to an energetic salesman who can tell him only the merits of his one particular make of vehicle. He may discover later that the highest priced car in all his fleet of trucks is the most worthless and that the smallest, cheapest machine is giving the best returns and its worth, to his mill, far more than the highest priced truck. On the other hand, a small capacity truck may be entirely unadapted to the uses of his mill and may prove a greater expense than had he purchased a so-called high priced car in the beginning.



KISSEL 3-TON TRUCK OWNED BY NEW BEDFORD COTTON MILL

PIERCE ARROW TRUCKS OF 2-TON AND 5-TON CAPACITY ARE OPERATED BY THE IPSWICH MILLS BETWEEN THEIR PLANTS AT IPSWICH, GLOUCESTER AND BOSTON. FROM GLOUCESTER TO BOSTON IS 35 MILES

PACKARD TRUCK HANDLING A SHIPMENT OF WOOL

There may be heavy loads for long hauls when a heavy truck will best meet the requirements. The same load may require unusual speed for delivery, when it would be better to split it into smaller lots and use lighter trucks to maintain this speed. There may be short hauls of heavy merchandise requiring heavy trucks for efficiency, or conditions may be changed and lighter loads may be more expeditiously handled in lighter trucks. There may be special work requiring the maintenance of a time schedule by trucks and the schedule may require light, fast trucks or heavy, slow ones.

The truck must be purchased to meet conditions which the manufacturer finds existing at his plant. A careful study of the conditions followed by careful observation and demonstration, should determine the kind of a truck best suited to the work before it.

A truck is a truck just as much as an automobile is an automobile—and no more. There is just as wide a difference in the manufacture of trucks as there is in a Pierce Arrow and a Ford. In fact, it is safe to say there is a much wider difference, for while the purchase of a Pierce Arrow limousine or a Ford runabout may depend wholly upon the purchaser's pocketbook and either car might carry its owner to the points he desired to reach, the selection of a motor truck should depend not only upon the question of economy but of efficiency. In society a man's family may require a high priced type of pleasure car to maintain the social position. With motor trucks it is different. Business is business. The truck which will give the largest returns, regardless of cost price, is the one which is most economical and most efficient.

REASONS FOR HIRING TRUCKMAN

Many mills which owned their own horses and did their own trucking a few years ago have now almost eliminated horses and are hiring the trucking done by motor vehicles. At first glance it would appear that in the interests of efficiency the mill should own its own trucks and save the extra profit which is being paid to the truckmen. Closer examination may reveal the reason why truckmen are getting the business.

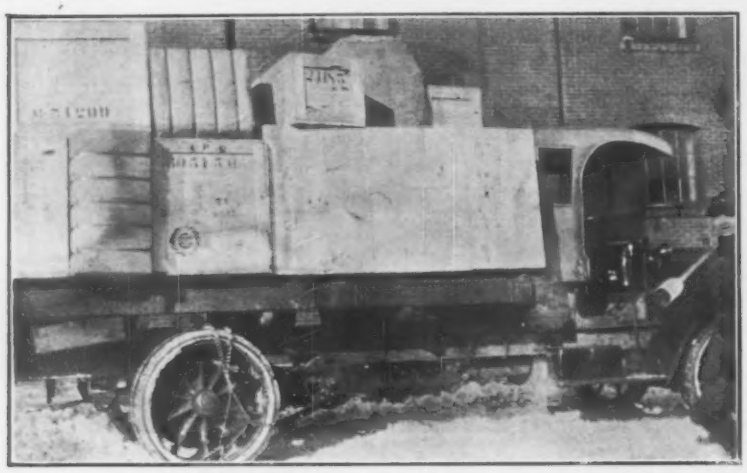
In the first place, if a mill finds that it can carry its load only one direction, over a haulage distance of many miles and will have to return empty, the truckman will carry that freight at a cheaper rate because he will find a load near the destination of that delilivery for his return trip. His truck will not run "dead" but will be earning him a profit on the return trip.

A small mill may have almost constant use for a truck and still find it more economical to hire its trucking done outside. This is undoubtedly due to the fact that the truckman, who operates many other trucks, has his own garage and own mechanics to keep his fleet of trucks in perfect condition, while the manufacturer would be obliged to hire a chauffeur and mechanic combined, at higher than the prevailing chauffeur's wage and if the chauffeur failed to carefully examine

the truck regularly, minor troubles would soon lead to larger difficulties and large repair bills.

Examination of several cases of New England mills which are hiring their trucking done by trucking companies fall, with but three exceptions, in one or the other of the above classes. Study of the three exceptions proves interesting.

A certain mill in Fall River was one of the very first in the country to dispose of its horses and substitute trucks. The change was sweeping and was made within a week. On the first day of July delivery of the trucks commenced at the mill. On the first day of August all the trucks were delivered and all of the horses had been sold. The trucks were all of one type but with two capacities, a part of the trucks carrying a one-ton load and the remainder carrying three tons. The trucks were to be used in hauling raw materials and supplies to the mill and in delivering the manufactured product to the freight sheds.



WHITE TRUCK OWNED BY PACIFIC MILLS

This particular mill had its own freight sidings, but occasionally suffered delay in getting a switching engine to haul out loaded cars and to leave carloads of supplies on the mill siding. Here was the opportunity to outwit the railroads in rushing freights, besides the chance to do whatever trucking had been done by horse-drawn vehicles. But the shipper didn't figure that gasoline and chauffeurs were drawing pay for work which before had cost the mill practically nothing. The plan of rushing freight away from the mill grew greater and greater, without a corresponding charge being made to the consignee for this express service. The practice of rushing supplies to the mill became more prevalent and was an entirely new item of cost. After a brief trial, this mill had its trucking done by a trucking concern, and by motor trucks, too, but the practice of rushing materials stopped when the mill ceased to operate its own trucks. The mill superintendent knows where the fault lay. The shipper knows where the fault lay. But the stockholders have not yet been brought to see the light and have refused to authorize the purchase of another fleet of trucks.

Another of the exceptions comes from a small Rhode Island town. Six horse-drawn trucks of large capacity were in use when the mill changed to two 2½-ton trucks and one 1-ton truck. Whether the mill made a poor bargain in the purchase of the trucks of whether it was the fault of the operators of the machines themselves, is uncertain, but the two large trucks frequently broke down and oftentimes used up the time of the smaller truck in hauling them to a garage for repairs. Shipments were delayed and a big bill of expense was incurred. Trucks were not so common then as now, nor were they perfected to their present degree, but the mill now frowns on owning its own trucks, although it has all of its trucking done by motors owned by a trucking concern.

"A truck salesman told me trucks wouldn't eat their heads off when they weren't working, but don't you ever believe that story. They not only eat their heads off, but their wheels and body as well," the superintendent of another mill declared. This was the third exception. This mill bought more trucks than it needed in order to have them ready during the busy season or in emergencies. They would run a truck to the platform, and while a crew was loading it, the chauffeur and helper would take another loaded car to the freight sheds and unload it. When a car broke down it would be towed to the garage and left there for a day or two until the repair men could run up a big bill. But mostly it was a case of not keeping the wheels moving—of not figuring on depreciation and interest on money invested.

MOST MILLS OWN TRUCKS

This company figured that by having more trucks than chauffeurs and by hiring unskilled laborers as loaders it could save money, but the plan failed. This company, while having its trucking done by truckmen, has learned its lesson and has placed an order for three trucks, a 1-ton, a 2½-ton and a 5-ton machine, and will do its own trucking as soon as delivery of the trucks is made.

The great majority of the New England textile mills are now operating, with increasing success, their own motor trucks. During the past two or three years the number of mills operating their own trucks has increased. Especially the larger mills have gradually increased their number of trucks. The increasing success of the use of trucks has also made possible a difference in the operation of mill properties.

CONNECT PACIFIC MILLS DEPARTMENTS

An example of this is contained at the big Pacific Mills in Lawrence, Mass. Before the advent of the motor trucks it was the policy of the mill to group its buildings near each other in order that the product might be moved from department to department at a minimum of expense. When the growth of the business demanded much larger additions, and when the growth of the mills had taken up all of the available space between the canal and the Merrimac River and between the railroad tracks and dam on the west and the plant of the American Woolen Company on the east, leaving only a stretch of business property and brick tenements along the opposite bank of the canal to be purchased and razed for the enlarged mills, the motor trucks came to the rescue. The big print mill, the largest of its kind in the world, was erected over a mile away from the original main plant, and motor trucks are the pulse which connects the two great plants.

One of the light 1-ton trucks leaves the shipping gate of the main factory every hour with the regularity of clockwork, for the print works. It carries mail, small packages and bundles, messages from departments, and any officials who have occasion to go to the print works. A half hour later the same truck leaves the print works for the main factory carrying a similar cargo. This truck operates throughout the day doing only this light work. The operating expense of the truck is more than saved by the car fares, postage and messenger charges which would otherwise be incurred, to say nothing of the saving of time and the dependability of the schedule in all kinds of weather.

Several large trucks propelled by electric power are operated by the Pacific Mills. The company maintains its own garage and charging station, and can thus supply the necessary current at a minimum of expense. While these are used largely for the shorter hauls, such as carrying freight from the mills to nearby storehouses, or carrying supplies from one department to another, they are also used for carrying the finished cotton goods to the print works, as the enclosed bodies of the trucks obviate the necessity of wrapping the product to keep it free from dust and the elements. Specially constructed units have been made, four of these units making a load. They operate on small wheels or casters, and a sufficient number of sets of them are in use so that while one truck is carrying a load to the print works, another set of units is packed and ready to slide to the floor of the truck as soon as the truck returns. On the trip back from the print works the trucks bring to the storehouses completed goods which can be placed in uniform packages and readily packed in the units. This is a class of goods which does not require speed in handling, so long as the supply is steady and the operating expenses of the trucks are kept sufficiently low to offset the saving in operating expense ordinarily charged to loss of time. A chauffeur and helper compose the crew of each electric truck. They do the loading and unloading.

Then there are the gasoline trucks of 1-ton, 3½-ton and 5-ton capacities. The two heavier style trucks, while doing a variety of work, may always be kept busy hauling manufactured cloth to the print works for finishing and bringing back the heavier cases of completed goods to the storehouse and freight sheds. Two of the big trucks do nothing but handle the ashes from the power house of the mills, carrying them into the suburbs where there is a ready market for them to be used as filling. Were these trucks not in operation, the mill would be obliged to pay for having the ashes carted away, whereas they now turn the item of ashes into a profit.

CUT ¼ OFF TRUCKING COST

"Ten years ago we had 15 horses in our stables," said F. E. Bachellor, shipping agent of the mills. "We have since enlarged our worsted department. The print department is now the largest in the world. The location of the print works, over a mile from the other mills, would necessitate much more teaming. The product from the cotton mills must go to the print works for printing and dyeing. This additional work would have required from 50 to 60 horses or even more.

"In 1907 we purchased three trucks. Now we have 18 of them. Two of these are of three-quarters of a ton capacity, five are of 5-ton capacity, two are of 3½-ton capacity, five are electrically operated covered trucks and may be loaded up to 4-ton capacity, while two heavy trucks are used entirely for carrying ashes.

"Generally speaking, it has been my experience that the trucks will do the work required at about three-quarters of the cost of doing the same work by horses. In addition, we have the advantage of having the trucks for use at night in emergencies, with a double shift of chauffeurs, while horses would be unable to stand this added work. The electric cars are operated slightly cheaper than the gasoline cars because we have our own charging plant. The electric trucks are more economical for the short hauls than the gasoline cars, in our experience, but cost the same to operate on the longer hauls.

"We have another plant at Dover. Occasionally we have to send machinery and supplies over the road to the Dover factory and this can be done with fewer handlings, with absolutely no delay and at a cheaper cost than were they sent by express or freight. We often send to Lowell, Fall River, Providence, Boston and elsewhere for supplies and the trucks make the trip without delay and, because of the long haul, operate at a very small expense. As a rule the longer hauls, because of less handling and fewer delays, are the more economical to make.

WHITE TRUCK READY TO UNLOAD FINISHED GOODS AT STOREHOUSE OF PACIFIC MILLS

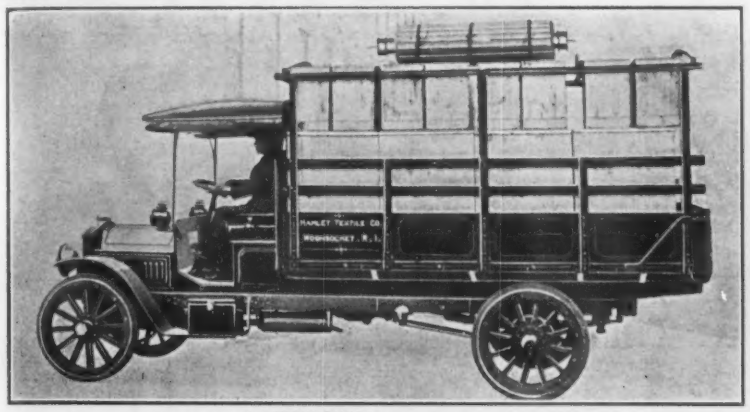
"Occasionally transportation delays have been overcome by means of motor trucks. One of these was in 1916 when a short term strike of locomotive engineers tied up trains and we moved our products to Boston by the trucks without loss of time."

motor trucks has been wonderfully increased, but the efficiency of horses could not be increased. One horse to day can do no more work than a horse could do ten years ago. A truck today is so great an improvement over the trucks of ten years ago that it can

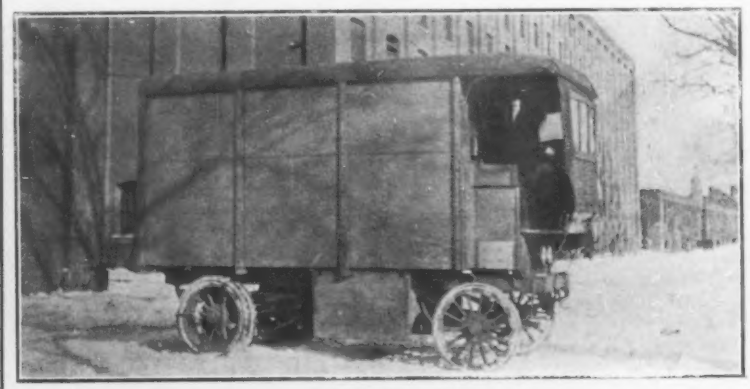
common of all three classes. Steam is generated by both gasoline and kerosene and provides a motive power which is probably cheaper than either gasoline or electricity, but the limited number of steam trucks in operation in the textile field is doubtless due to the extremely limited number of companies manufacturing them.

been found that the trucks are a money and time saver to the mill.

At some of the mills, where certain work is performed by the same trucks day in and day out, special devices have been arranged for the speedy handling of freight and for cutting down the energy needed in the operation of the cars, with the resulting saving in fuel and accessories.



1½-TON FEDERAL TRUCK OWNED BY HAMLET TEXTILE CO.



ELECTRIC TRUCK OF LARGE CAPACITY USED BY PACIFIC MILLS

Examination of the shipping schedule of the mill shows that for the past few years, until early in 1916, the operating cost of the trucks averaged approximately $1 per ton capacity per hour. A one-ton truck cost on the average $1 an hour and a 5-ton truck cost $5 an hour. A 3-ton truck cost a little higher than this average because two men were required on these trucks, but they were also used in many of the long hauls where speed was a more essential factor and where the operating averages could be reduced.

Recent increases in wages, increases in the cost of gasoline, increases in the cost of tires and supplies, have increased the operating cost of the trucks so that a one-ton truck is now figured as costing $1.35 per hour and a 5-ton truck costs approximately $7 an hour. But these increases in motor truck operation are lower than the increases have been in the cost of grain, hay, etc., which would be required for horses.

In other words, when trucks were first introduced at the Pacific Mills to replace horses the 18 trucks were operated at an average cost of about $74 per hour with carrying capacity of 75 tons per hour. With the increases in wages and materials, the operating cost for these same trucks to-day reaches $95 per hour. The first cost of $74 per hour for trucks compared with a cost of $93 per hour for horse-drawn trucks, means a saving of $19 an hour, $171 a day, $51,300 a year in favor of trucks.

The saving to-day is in favor of the trucks and is far greater and is more or less problematical. Originally three trucks did the work of fifteen horses, and they were of the smaller capacity type. On the same basis, the eighteen trucks operated to-day are doing work which a hundred horses could not do. During the past ten years, efficiency of

do nearly double the amount of work done then. The saving is so great that were the figures to be written out, the reader would declare an error in figuring had been made, but a few minutes work by the statistically inclined will satisfy their curiosity, even if figured that the truck does no more work to-day than a decade ago. The figures given in the cost of the operating of trucks include the wages of the chauffeur, wages of the helpers, cost of gasoline or electricity, cost of upkeep of the trucks, depreciation on investment,

20,000-LB. LOAD ON TRUCK AND TRAILER

insurance, registration, licenses and all other costs which enter into the purchase and operation of the trucks.

Operation of the electric trucks for short hauls in mills manufacturing their own current is becoming quite common, although, because of the short hauls, the electric trucks are not so often seen on the traveled highways. The Slater Mill in Webster, Mass., operates electric trucks; the Massachusetts Cotton Mills at Lowell are using electrically operated trucks to advantage at their plant. Many other mills operate one or two such trucks. Double sets of batteries are provided for the electric trucks, and while one set is being used to drive the truck, the other is being charged in readiness for use.

Steam trucks are probably the least

Hardly a mill of any considerable size in Massachusetts but is using motor trucks. Many of the smaller mills, where their trucking is done by truckmen, know that their merchandise is being handled more quickly and just as cheaply, if not more cheaply, since the truckmen introduced motor vehicles. Most of these mills own and operate one truck for their own convenience. Where the mills are located at a distance from railroad stations and the city, town or village centers, a light truck, either of three-quarters or one ton capacity, is used to "run errands." It brings the mail, the odds and ends of supplies, etc., to the mill and carries to the village smaller parcels, mail, rush orders ready for delivery, and similar articles. The chauffeur in these cases is usually expected to keep his truck in condition. Even in these cases it has

SPECIAL DEVICES CONSERVE ENERGY

At least two Massachusetts textile companies are using steam trucks on a small scale. The trucks are of light weight themselves, although capable of carrying loads up to three tons. Economy of operation and maximum of speed are the strong points which the owners advance in favor of the steam trucks.

Hardly a mill of any considerable size in Massachusetts but is using motor

The Nonquit Mills in New Bedford, for example, operate a truck carrying a regular line of goods between two of its big buildings. Instead of operating this truck over a roadway on rubber or pneumatic tires, a truck has been fitted up with specially constructed wheels similar to those of railroad cars, and wooden rails have been laid, so that the truck plies back and forth over this track. Specially constructed cranes are used in loading and unloading the truck at each building.

The New England Cotton Yarn Co. of New Bedford have in operation several trucks of different capacities, replacing the work of many horses, and they have found that the saving is of considerable proportions, while to attempt to do the same amount of work with horses would be futile.

LINKING UP MILLS

Many of the textile companies have mills located in different cities or towns within a few miles of each other and not connected by a direct line of railroad. To companies located in this manner, every one is operating motor trucks as the connecting link between the mills.

The motor truck to such companies has proved doubly valuable, for it has not only reduced the time required to send supplies from one mill to another to a minimum in time and expense, but it has permitted the centralization of work in the different mills. Before the days of the motor trucks one kind of goods was turned out in a certain mill and another class of goods in another.

R. WOLFENDEN & SONS USE THESE 2 AND 5-TON PIERCE ARROW TRUCKS BETWEEN ATTLEBORO, NEWTON AND BOSTON

TYPE OF PIERCE ARROW TRUCK USED BY THE AMERICAN WOOLEN COMPANY. THESE TRUCKS ARE OF 2-TON CAPACITY

Similar work was being done in all of the factories. Now with the motor trucks, it has been possible to have one

Concrete for Textiles---

In giving Turner the contracts for his great 1,000 foot reinforced concrete Belleville Warehouse, Mr. William Whitman confirmed the judgment of fifteen other leading manufacturers in the textile field. Mr. Whitman wanted a contractor who would make the job move fast and have the warehouse ready on the date needed. Turner did better than that — he gave occupancy *before* the date promised.

This Mammoth Belleville Warehouse was built in four sections. The first two were built in 1916. Turner averaged one complete story a week on each section, including curtain walls and window sash set. Section No. 1 was ready *two days before promised* and the Section No. 2 was *occupied nine days ahead of time*, 3½ months being the approximate time consumed in completing each section. Naturally, when Mr. Whitman decided last May to add the other two sections, Turner got the contract *without competition.* Although handicapped by labor shortage and freight embargoes, Sections 3 and 4 were also finished in 3½ months.

This kind of service has made possible Turner's record of 645 concrete contracts in 16 years without a single penalty for failure to complete on time—49 percent of them repeat orders and 40 percent "cost-plus-percentage" contracts without competition.

Before *you* employ a contractor, ask these textile owners what they think of Turner:

Other Turner Clients in Textiles

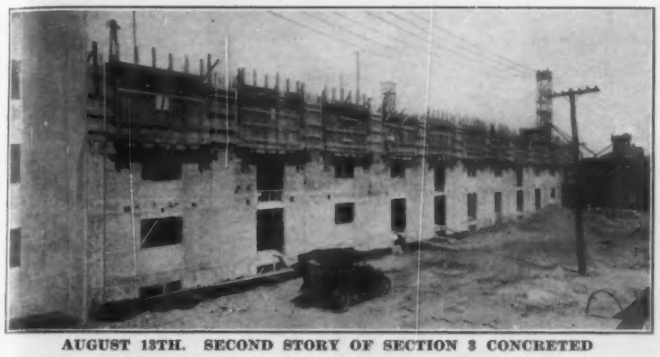
American Paper Tube Co.
Sidney Blumenthal & Co., Inc.
Black Cat Textiles Co.
Butler Mill
Chalmers Knitting Co.
Nashua Manufacturing Co.
Naumkeag Steam Cotton Co.
New Bedford Storage Warehouse Co.
Newkraft Manufacturing Co.
Robert Reiner Importing Co.
Scranton Lace Curtain Co.
Shuttleworth Bros. Co.
United Piece Dye Works
Norwich Woolen Co.

Turner Construction Company

244 Madison Avenue, New York

Prudential Bldg., Buffalo **45 Milk Street, Boston**

"Turner for Concrete"



AUGUST 13TH. SECOND STORY OF SECTION 3 CONCRETED

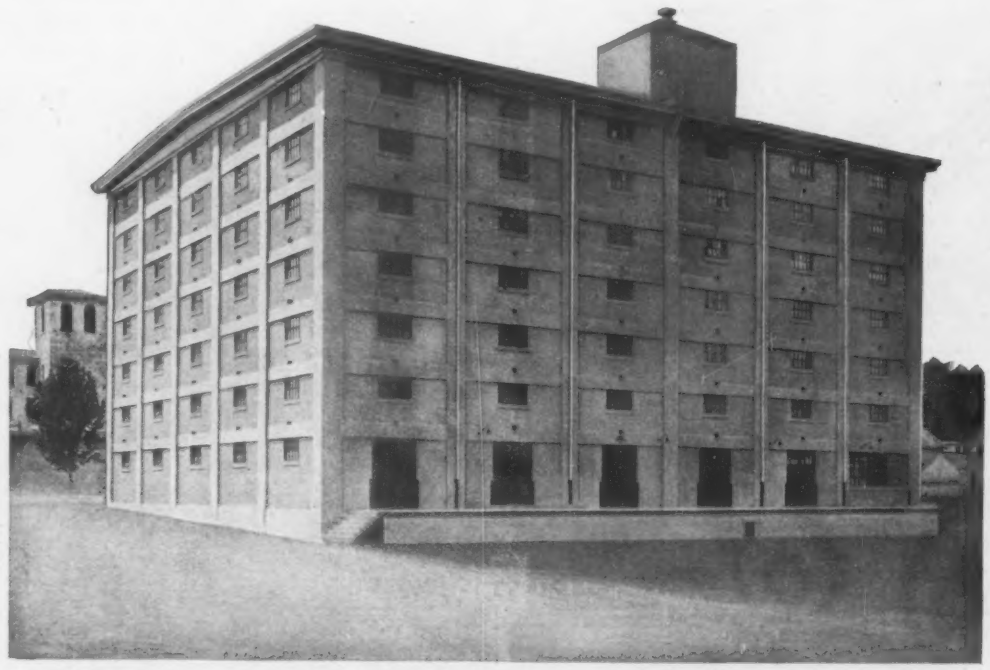
OCTOBER 6TH. CONCRETING THIRD STORY OF SECTION 4

SEPTEMBER 25TH. TOPPING OFF THE ROOF OF SECTION 3

OCTOBER 22ND. CONCRETING SIXTH STORY OF SECTION 4

DECEMBER 15TH. SECTION 4 COMPLETED

C. R. Makepeace & Company, Architects and Engineers



New 10,000 Bale Cotton Storehouse

This seven-story cotton warehouse was designed by us for the Goodyear Cotton Mills, Inc. The building is 102 by 122 feet and provides more than 87,000 square feet of floor space. A loading platform extends the complete length of the building.

A section of the lower floor is partitioned off by a terra cotta fire wall and contains two bale openers. The cotton is carried by fan to the pickers in another building, the pipe line being in a tunnel connecting the two buildings.

In addition to doing the designing and engineering work on buildings, this organization is qualified to handle plans and specifications for the complete equipment of textile mills, including steam and hydraulic power plants. Furthermore, the reorganization of textile and industrial plants is a highly developed function of this concern.

CHARLES T. MAIN

Mill Engineer and Architect

201 Devonshire Street **Boston, Mass.**

4-53

mill do all of one class of work and another mill do a certain part of the finishing, etc. This has resulted in increased efficiency in operation and production.

EXPERIENCE OF AETNA MILLS

Superintendent McNeilly of the Aetna Mills, of Watertown, says: "We couldn't get along without the motor trucks. They are as much a part of the business as the power house.

"To us trucks have meant a great saving which cannot be computed in dollars and cents. They have cut out more than a third of our shipping costs. By means of them we can take advantage of the lifting of embargoes to jump our empties to the nearest freight terminals. We can send to Providence, Woonsocket or elsewhere for supplies when we need them in a rush. We can send our manufactured products to the neighboring freight depots which will put the freight on the direct line of shipment without the necessity of transferring it by roundabout means from one freight station to its destination.

"Under existing conditions there is sent to Watertown one express car load a day by railroad, which arrives here in the morning and the contents are delivered during the day by the express teams. To secure supplies by express, we would order them one day, they would be shipped the following morning and if we were lucky, we would have them delivered to us about noontime. This means that it requires 24 hours to get express matter from Boston. Now if we want anything in Boston, our own trucks bring it out to us and it never takes more than two hours to get it here.

"Some of our customers are located in out-of-the-way places. Many of the Boston concerns are thus situated. It would not pay us to run our trucks a couple of miles or so out of the way to deliver a small shipment or to collect small quantities of goods. In Boston we have taken care of this difficulty by hiring a local expressman to make these collections and deliveries for us and our trucks then go to the general express office where the transfer is made. We have likewise had a box placed at the general express office for our benefit, and many of our customers get their articles direct from the express office by their own teams while we can have our articles delivered at the express office by those from whom we buy. This also proves a time saver of some importance to us."

The Aetna mills formerly hired much of their trucking done. The advent of motor trucks has resulted in a saving of more than $200 a month. Before they purchased trucks, some of their finished product was sent over the road by horse-drawn vehicles, using two or four horses to the load. It took the greater part of an entire day to haul a load to Boston and secure a load to haul back to Watertown, although Watertown is but seven miles from Boston. With motor trucks three such trips are made without difficulty. The company is so well pleased with the working of the trucks that others are to be added as soon as obtainable.

In the long distance hauling, the use of the trailer is yet in its infancy. Like all things new, it is causing some trouble in some quarters. A Lowell concern receives a truck and trailer load of wool daily from Boston and sends back a similar load of degreased wool. The total load on the trip outweighs between 10 and 11 tons and the return load, equally bulky, is slightly lighter in weight. The round trip is 60 miles. There is a chauffeur and helper operating the truck and trailer. Yet the charge is less than 20 per cent higher than the express rate between Boston and Lowell besides doing away with the handling of the goods five different times and saving from 24 to 36 hours in transit. And this work is not done by the mill but by a trucking contractor and has been carried on since early last April.

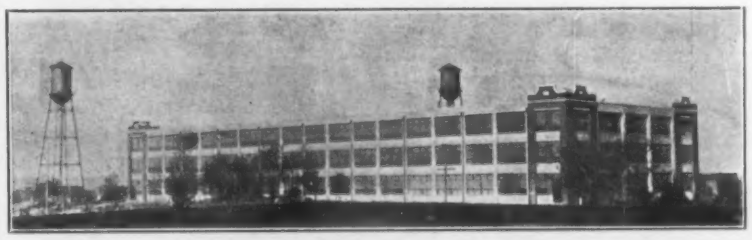
Indirect Lighting at Republic Cotton Mills*

Units Have Capacity of 500 Watts —Fixtures and Arrangement Used

By *George Wrigley*

IN the older type textile mill buildings of slow burning, timber construction, equipped with mechanical or large group motor drives, the obstructions and dirt deposits due to belts, together with the low reflecting value of the ceiling surface made the direct lighting system practically imperative. The new construction of reinforced concrete with unobstructed ceilings of permanently white surface, and the elimination of belts through individual motor drives allows an entirely different treatment of the artificial lighting.

At least fifteen years ago a system of indirect lighting, with inverted arc lamps, was tried in some of the English textile mills, but did not secure extended approval and probably proved unsatisfactory because of the troublesome maintenance of the arcs. The development of the larger size gas-filled incandescent lamps has provided a unit which when properly installed is ideal for indirect lighting service.



GENERAL VIEW OF REPUBLIC COTTON MILLS, NO. 2

WARPER ROOM BY ARTIFICIAL LIGHT

OBJECTION IN PREPARATORY WORK

In a textile plant the preparatory processes involve the circulation and deposit of quantities of lint and dust. In the spinning and weaving processes this occurs only to a limited extent. While there is some objection to the indirect units in the preparatory departments, this objection is of no serious consequence in the other departments, especially if means are provided for keeping the lint from direct contact with the high temperature lamp bulb. The processes in the preparatory department are of such a nature as not to necessitate eye strain.

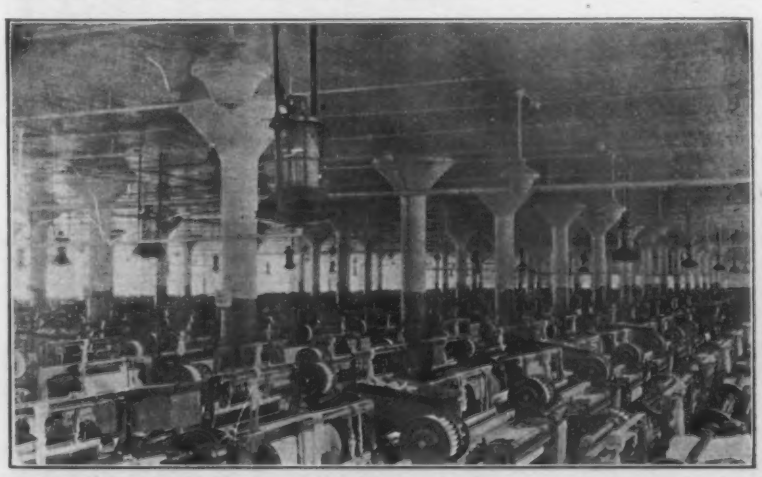
When the Republic Cotton Mills, at Great Falls, S. C., decided to build their No. 2 Plant, the owners requested that the indirect lighting system be used if practicable, especially as it was planned to operate this plant on both night and day runs. This mill is housed in a modern building of reinforced concrete construction three stories in height and with over-all dimensions of 398 ft. by 131 ft. (121 by 40 m.) Small group-drive motors with belts are used in the preparatory departments and individual motor drives are used in the weave room and the spinning room. This plant is designed to manufacture cotton print cloths and does not finish or print the product.

A fixture suitable for use with either a 500- or a 750-watt gas-filled incandescent lamp was designed and the approval of the insurance underwriters obtained for using this unit in the weaving and spinning departments on the second and third floors, respectively. Direct lighting was adopted for the preparatory departments on the first floor.

500 WATT UNITS

The units as finally installed have a capacity of 500 watts and each contains a single lamp. The units are installed on rectangles measuring 22 by 26 ft. (6.7 by 7.9 m.), a total of 572 sq. ft. (54 sq. m.), an equivalent of 0.874 watt per square foot. The fixture consists of a steel shell bowl enclosing a glass bowl with spiralled mirror reflecting surface, and a cover bowl of clear, heat-resisting glass. The cover bowl projects beyond the edge of the lower steel bowl, leaving an air space for ventilation. Cooling air passes through this opening, down between the steel bowl and the reflector, up through an opening in the bottom of the reflector, past the lamp and out at ventilating open-

* Paper prepared for convention of Illuminating Engineering Society.



WEAVE ROOM BY DAY LIGHT

WEAVE ROOM BY ARTIFICIAL LIGHT

STEAM TURBINE ROOM
ERLANGER COTTON MILLS
LEXINGTON, N. C.

Maximum economy in the power plant pays the owners directly and incidentally serves the patriotic cause of fuel conservation.

Lack of economy may be due to improper design and arrangement, causing poor combustion, low temperature of feed water, or wastage of steam through leakage or inefficient utilization.

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J. E. SIRRINE

Mill Engineer and Architect

Greenville, S. C.

ings near the fixture stem. The fixtures are suspended by rigid conduit with the cover bowl 42 in. (106 cm.) from the ceiling, and approximately 8 ft. (2.4 m.) above the average working plane.

The lighting effect obtained is very satisfactory, and the working visibility of a high order. In comparison with direct lighting on similar work, eye fatigue is noticeably lessened.

In consideration of the results obtained, together with the low cost of power, amounting to approximately 0.65 of a cent per kilowatt hour, the slight increase in power consumption over direct lighting practice is not serious.

To some extent the photographs show the absence of hard shadows under the machines, the details of machinery and the yarn in process of manufacture.

Coal Handling Plants for Mills

Efficient Plant Installed for Wyandotte Worsted Company

By *G. P. Carver* *

IN these days of high prices and labor shortage it is necessary that all operations be accomplished with the maximum efficiency. This is especially true of the handling and storage of coal. Many mills have no facilities for the handling and storage of coal other than a railroad siding and an area on which to pile it. Sometimes the layout of the plant makes it necessary to store coal in some location other than adjacent to the point at which it is used.

Where the facilities consist of nothing except the railroad siding and an area to store, the process of handling and storing consists, after the railroad cars are placed, of unloading from the cars by laborers armed with shovels. This process is slow and expensive, and many times adds a demurrage charge to the cost of handling; moreover there is always the difficulty of obtaining laborers for the work.

When the coal is unloaded from the cars it is either thrown directly on to the ground and stored in piles along one or both sides of the track, or it is thrown into teams and hauled to store piles from which it is later taken by teams, wheelbarrows or industrial cars to the boiler room, where it is again man-handled to boilers. All of these operations are, of course, slow and expensive, and consequently inefficient. On the score of economy and efficiency it is necessary that all coal from railroad cars to storage and to boilers be automatically handled.

AN EFFICIENT LAYOUT

The ideal layout for the efficient handling of coal for mills consists in having a concrete track hopper in railroad siding into which the coal can be drawn from the hopper bottom cars. That part of the hopper directly under the tracks, and which receives the coal as the car hoppers are opened, to have four sides, sloping to a gate opening on one side and that part of the hopper beyond the track to be fitted with an oscillating feeder to uniformly feed the coal to a crusher and from the crusher to a steel "boot" supporting the lower end of a bucket elevator, or belt conveyor, of the required capacity, on which the coal is elevated and carried either to store piles or to boiler-room bunkers, from which it is drawn through chutes and scales to automatic stokers to boilers.

If coal be carried by conveyor to a store pile which is unrestrained or not enclosed with retaining walls, or in an elevated pocket, it is necessary that there be installed additional conveyors or handling devices to carry this stored coal to the boiler room, bunker or floor, and manual labor practically eliminated.

Where the storage is in elevated pockets, it is a simple matter to draw the coal from gate openings in same to conveyors or bucket elevators and carry it to the boiler room as required. Where the coal is piled on the ground, with or without retaining walls, it is necessary to rehandle it by some satisfactory device best fitted to the conditions. Where a locomotive crane is continually in use for various purposes throughout the plant it could be used to advantage to pick up the coal with clam shell bucket and deposit into a hopper-feeding conveyor to boiler room.

Another method in rehandling coal from ground storage pile is the construction of a tunnel the length of the coal pile, the tunnel to be equipped with a flight or belt conveyor which is fed from gate openings in tunnel sides or roof, the conveyor carrying the coal to the boiler room.

WYANDOTTE COMPANY'S PLANT

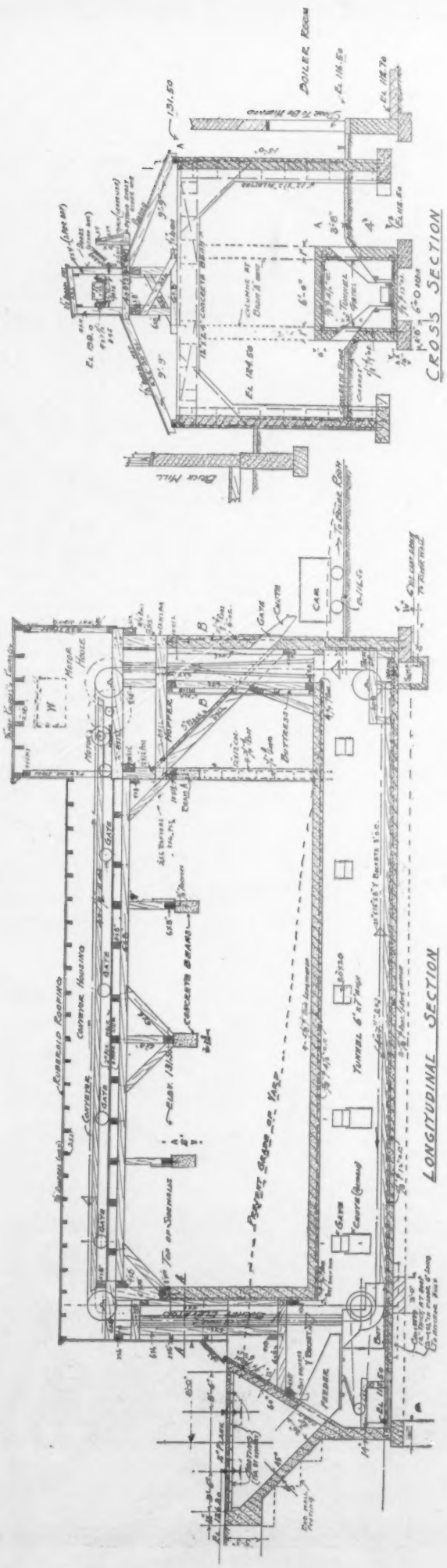
At the present time the Wyandotte Worsted Co., of Waterville, Me., is having a coal handling and storage plant installed from the plans and specifications of the writer. This plant consists of an 800-ton concrete coal pocket located between two of the mill buildings, and one end of the coal pocket adjoining the boiler room.

There is a railroad siding running in front, and about 10 feet from the mill property, and in this track opposite the location of the coal pocket there is a concrete track hopper fitted with a grating of 10 x 10 inch mesh opening, which prevents the larger lumps from reaching the elevator and in this way eliminating the necessity of a larger capacity elevator.

The pocket as designed provides for ground storage with an endless V bucket conveyor system, the upper run being carried on a supporting frame work and the lower run secured to the floor of the tunnel under the floor of the pocket. The coal is drawn from the hopper bottom cars into the track hopper, and flowing through gate opening on to an oscillating feeder, it feeds into elevator buckets and is elevated to the top of the pocket and carried in a horizontal trough fitted with slide rack and pinion gates operated with handwheels. The coal is drawn through any of these gate openings and the pocket is filled.

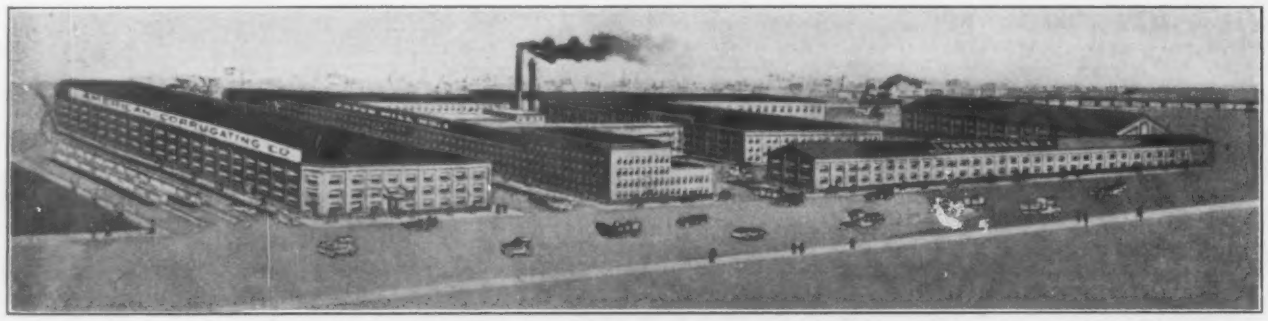
At the further end of the pocket an elevated hopper is constructed, and while the pocket is being filled this hopper is also loaded and coal is drawn from the hopper through gate opening over chutes to industrial cars and wheeled into the boiler room. When this hopper has been emptied, the conveyor is started and an operator opens any one of the gates in the tunnel walls and coal is fed to the conveyor which carries it through the tunnel, up to the top, and over the pocket, and discharges it into the hopper from which it is drawn and wheeled to the boiler room. In this way this hopper can be filled every other day (the hopper having two days' supply for the needs of the power plant) and the coal drawn off as required.

With this layout hand shoveling is practically eliminated, all operations



COAL HANDLING AND STORAGE PLANT INSTALLED AT WYANDOTTE WORSTED COMPANY, WATERVILLE, ME.

* *Coaling Plant Engineer*, 53 State St., Boston, Mass.



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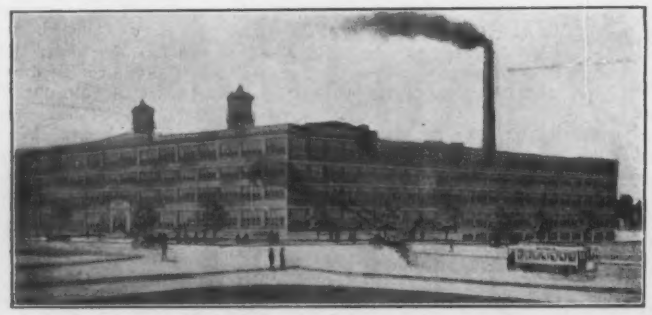

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and handling being automatic, and the necessity for laborers is reduced to a minimum. After the motor switch is thrown in, starting the conveyor, and the coal car set over the track hopper and opened, the coal is carried to the small cars feeding the boiler room without manual labor except for opening and closing a gate.

Assuming that a plant of this kind and capacity costs $10,000 to install, and electric current costs two cents per ton to handle, and assuming 5 per cent interest on the investment and 10 per cent depreciation on the machinery, which costs approximately $3,000 (there is no depreciation in the structural parts of the pocket other than the machinery), the cost to operate will be:

10,000 tons handled per year @ .02 (electric current)	$200
5 per cent interest on $10,000....	500
10 per cent depreciation on $3,000 (cost of machinery).....	300
	$1,000

The total cost to handle coal on this basis would be ten cents per ton. The cost to handle coal without the plant, where hand shoveling was required, teaming from cars to store pile, and from store pile to boiler room would cost not less than thirty cents per ton; showing a net saving of twenty cents per ton in handling through the plant as described, or a saving of $2,000 per year, which would, of course, be more if the amount of coal handled through the pocket were greater; and the plant as described has a handling capacity of several times 10,000 tons per year.

This layout permits quick unloading of cars, eliminating demurrage charges, it being possible to unload a 50-ton car in from thirty minutes to one hour.

If the installation of a plant of this kind showed no actual saving in money, it would be warranted on account of the greater efficiency in handling, and the freedom from labor troubles; also the amount of storage with a pocket is far in excess of what is possible on the same area without a pocket, in this way making it possible to use storage areas which would otherwise be of insufficient size for the purpose.

Plants cannot afford to be without facilities of this kind. There are many kinds of installation possible and one of them will fit any condition.

Boiler Control, Coal Economy and Production

What They Mean to the Manufacturer in Dollars Saved—Aids to Operation

By *Abram T. Baldwin* *

IN the writer's article dealing with the high cost of coal, in the Oct. 6 issue of TEXTILE WORLD JOURNAL, it was suggested that the boiler unit be considered as consisting of two divisions, the combustion chamber, in which the production of heat takes place, and the boiler in which the heat produced in the combustion chamber is consumed. The present article will treat particularly of the boiler unit, but also in conjunction with the combustion chamber.

In this presentation, boilers may be treated as consisting of three main divisions or forms. First, the horizontal or return tubular. Second, the vertical or water tube of the round type. Third, the vertical or slant water tube type in which each plane of tubes may be treated as an individual boiler. In both the return tubular and vertical round types of boiler, there is a varying tube area exposed to the gases, when looking at the boiler from the front. In other words, through the center of the boiler from the combustion chamber to outlet on about this line, the largest nest of tubes is found. Whereas there might be but three or four tubes located at either side of the boiler in either of these constructions, there would be eight or twelve tubes in the nests on the center line of the boiler or just either side of the center line.

Compared with this are the boilers of the third type, in which there are an equal number of tubes or nests in each lateral plane of the boiler. The point is brought up for the reason that the gas delivered to each set of tubes for any boiler construction should be in proportion to the heating surface or tube area. Consequently, the amount of gas delivered from the combustion chamber to boiler should be proportioned to the tube heating area.

Take, for instance, a return tubular boiler in which the two high points of the combustion chamber reach to a point approaching the horizontal diameter of the drum. The heated gas, rising to the high points, will tend to travel along either side of the return tubular boiler shell to the rear of the boiler, where it will enter or tend to enter the tubes. The gas having risen to the high point of the combustion chamber will seek in the travel the line of least resistance, and, therefore, tend to pass through the point in the boiler containing the fewest number of tubes, leaving the center nest to take that amount of gas that will not pass through the smaller nests of tubes.

This design may be improved in its efficiency by not allowing the green gases to come into contact with the comparatively speaking cold boiler shell; second, by giving greater time for complete combustion of the gases due to an increase in travel before entering the tubes; and third, by proportioning the delivery of the gases for the varying heating surface of the boiler.

PROPORTIONING HEAT AND SURFACE

Relative to the three points the following treatment has been suggested, tried and found to be successful. Flatten the arch over the combustion chamber to keep the incompletely formed gases away from the comparatively cold boiler shell. Place an arch, the center of which would be at the center line of boiler, letting the arch be in a baffle wall placed in a plane at the rear end of the boiler; the bottom or base of the arch being on the floor of the ash pit, thus forcing the gases to travel over the bridge wall and down back of the bridge wall through the arch and up into the rear end of the boiler. This accomplishes two points, increased length of travel of gas and concentration of the largest volume of gas at the point where the maximum heating surface is placed in the boiler.

By the placing of an arch other than the arch over the combustion chamber, actual savings of 20 per cent fuel were accomplished in return tubular boiler operation. From the same reasoning as above, that is, applying a principle of proportioning the gas heating supply to the tubular heating surface, the same effect is obtained in a vertical water tube boiler. This actually in effect is an arch in a horizontal plane, which causes the gas traveling from the combustion chamber to the tubes to divide itself proportionally to the tube areas. In this type of boiler there is usually all the opportunity necessary for a proper design of a combustion chamber area for complete combustion of the gases and to give the proper length of travel for accomplishing this before delivery of the gases to the heating surfaces.

In the third type of boiler the design of stoker is more important on account of the necessity for delivering an equal amount of gas to every lateral row of tubes in the boiler. The efficiency from this point on through the boiler to the outlet now depends on the design and construction of the boiler. Also the efficiency depends upon the question of maintenance and control. For without these latter two points no boiler after service can show efficient results.

WATER SUPPLY

As to the proper points of control of a boiler, the first to be considered is that of the treatment of the water in order that no scale be formed on the inside of the tube, or as in the case of the return tubular, on the outside of the tube. All waters are amenable to a treatment that will result in the minimum of incrustation. A study of this question for every boiler plant is necessary if efficient results are to be obtained.

Too much attention cannot be devoted to both the scale forming qualities and temperature of the boiler feed water, as both are causes of loss of efficiency and of coal. The first has been referred to above, and the latter is one in which utilization of waste heat and condensed water should be effected. The saving of returns from heating systems, the saving due to the utilization of exhaust steam of the installation of hot water heaters or economizers are mentioned to bring to mind means to increase the temperature of the feed water. This naturally reduces to a minimum the required heat to raise the temperature of the boiler water to the steaming point. The ability of the boiler feed pump to pump hot water influences this, but, nevertheless, effort and thought should be put into it to raise the temperature to the maximum point, say 200° to 212° F.

AIR SUPPLY

Air may be treated in the same manner as water, preheating it by utilizing the heat of radiation. When a boiler house requires heating to make it comfortable, the utilization of radiated

(*Continued on page* 437)

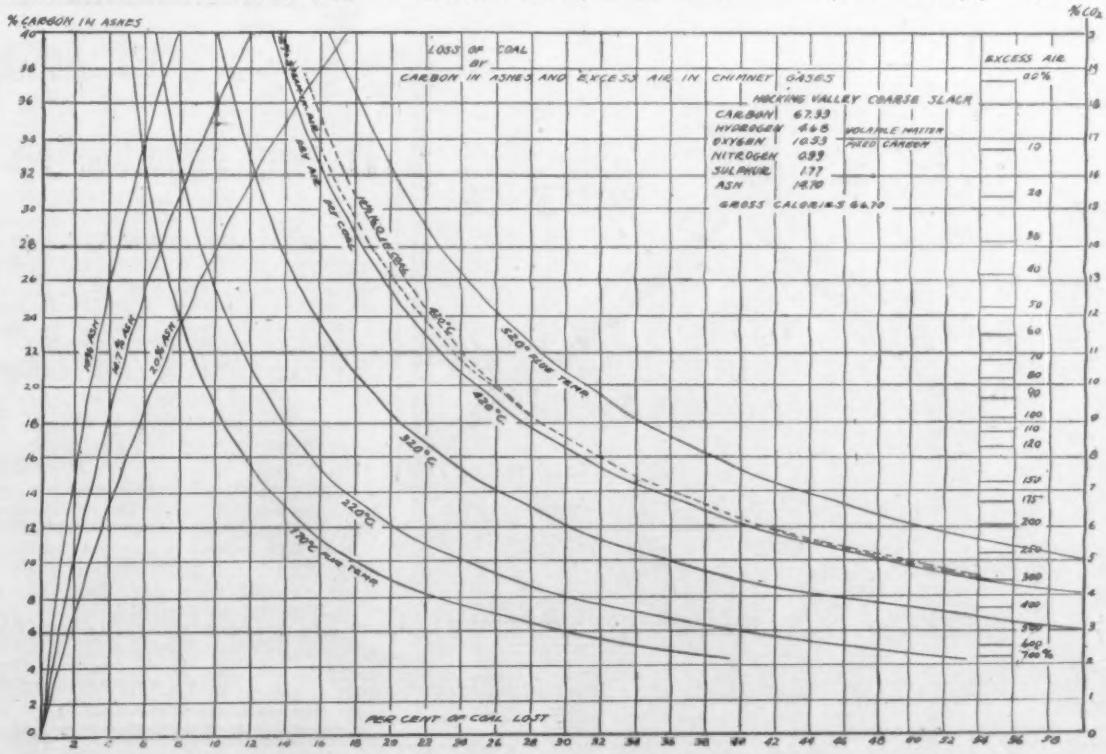
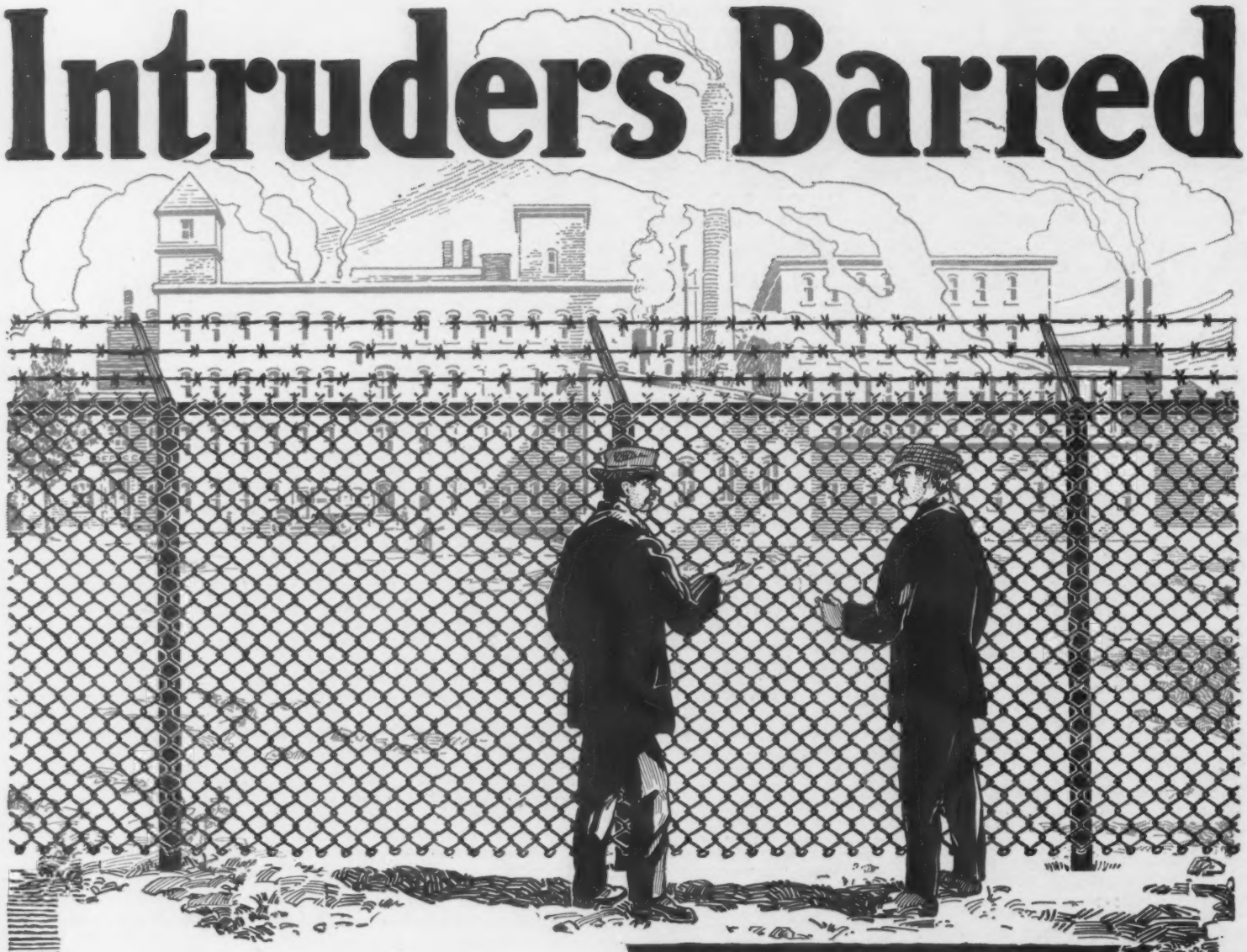


FIG. 1. CHART SHOWING WASTE OF COAL

* President and General Manager, Precision Instrument Co.

Intruders Barred



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"Since erecting Cyclone Fence around our plant we have reduced the number of watchmen from 20 to one man." — John Bjorn, Supt., Nash Motors Co., Kenosha, Wis.

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Report of Mill Construction for 1917

New Projects, Enlargements and Improvements

Statistical Review Compiled from Textile World Journal Records

THE reports of mill construction compiled by TEXTILE WORLD JOURNAL during the last year show a steady gain in the industry. Beginning with January, each month has brought several new mill developments and important enlargements, the projects running remarkably even throughout the year. It seems likely that the record would have been much larger if equipment had been more readily procurable. Every card, spindle and loom turned out by the machinery builders was contracted for months ahead, either for replacement or additional equipment, and the prospect of waiting for machinery undoubtedly checked many proposed developments. The high cost of materials entering into construction work and the scarcity and high cost of construction labor also caused the postponement of many projects.

But despite these unfavorable influences, the demand for textile products was so large that many manufacturers considered it unwise to await lower building costs or better machinery deliveries, and the average growth of the last ten years has been exceeded, as it was in the year 1916, by a good margin. This seems to be the case, as it was the previous year, in both number and importance of projects in all the chief divisions of the industry, except the knitting branch.

Comparison of New Mill Construction for Last Ten Years

	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.
Cotton	52	51	24	26	27	37	32	67	80	47
Wool	24	32	19	21	24	24	20	31	47	23
Knitting	97	113	111	110	142	122	92	112	105	94
Silk	86	60	25	51	54	46	32	34	37	33
Miscellaneous	38	33	40	37	30	36	26	29	20	25
	297	280	219	245	277	265	208	274	289	222

The total number of new mills for the year is given as 297, a figure that we must go back to 1906 to equal. In that year 303 new mill projects were reported. As shown in the accompanying table the figure for 1916 was 280; while the average for ten years from 1907 to 1916 is 254 new mills. Miscellaneous new plants, including dyeing, bleaching and finishing works, and the silk industry show a large increase over 1916, with silk making the largest gain. Cotton and woolen mills show a smaller increase and the knitting industry shows a loss, fewer new knitting mills being established than in any year since 1911, although the actual number of new knitting plants is larger than the number of new mills in any of the other branches. The table giving the comparison of new mill construction for the last ten years shows the number of new plants in each division and the total figures for each year.

COTTON INDUSTRY

With fifty-two new mills, or separate large new departments of existing companies, the cotton industry makes a creditable showing, particularly as there was no abnormal expansion in any one line corresponding with the tremendous growth in the tire fabric industry during 1916. The enlargements and improvements made by old established mills are generally of more importance than the new mill projects in any year and this holds true for 1917. Of the new projects the largest number were established in North Carolina, and in the average importance of these projects North Carolina also leads. Other Southern States to add new cotton mills are Alabama, Georgia, South Carolina, Texas and Tennessee. Among the notable new cotton mills of the year may be mentioned the Penrod Mills, at New Bedford, Mass., which will make tire fabrics; the Ranlo Manufacturing Co., Gastonia, N. C., which will make fine combed yarns; the Smyre Manufacturing Co., Gastonia, N. C., which will make fine combed yarns; Wear Well Bedspread Mills, Leaksville, N. C.; Cheraw Cotton Mills, Cheraw, S. C., carded hosiery yarns, and the Cherokee Spinning Co., Knoxville, Tenn., fine combed cotton yarns for hosiery and for processing.

Important enlargements and improvements were made by the following old-established concerns: Lanett Cotton Mills, Lanett, Ala.; California Cotton Mills, Oakland, Cal.; West Point (Ga.) Manufacturing Co.; Atlantic Mills Department of the Pacific Mills, at Lawrence, Mass.; Manomet Mills, New Bedford, Mass.; Nashawena Mills and Nonquit Spinning Co., of New Bedford; Newmarket Manufacturing Co., Newmarket, N. H.; Mays Landing (N. J.) Water Power Co.; German-American Mills, Draper, N. C.; the Mays Mills, Inc., Maysworth, N. C.; Crown Manufacturing Co., Pawtucket, R. I.; Winnsboro (S. C.) Cotton Mills.

WOOLEN AND WORSTED INDUSTRY

Of the twenty-four new woolen and worsted mills, nine are in New England, six in Pennsylvania, and one each in California, Illinois, New Jersey, New York, Ohio, Oregon, Tennessee, Utah and Wisconsin. Most of the new enterprises are small and of less importance than many of the changes and extensions made by old companies. The most notable of the new mills is perhaps the Norwich (Conn.) Woolen Co. The Narragansett Worsted Mills, of the American Woolen Co., at Warren, R. I., is the latest addition to the big company. The property at Warren was purchased some years ago by the American Woolen Co., and has been started up on yarns.

Among the noteworthy enlargements and improvements are the addition to the Vassalboro (Me.) Mills, of the American Woolen Co., improvements at the Wyandotte Worsted Co., Waterville, Me., additions to the plant of Clark, Cutler, McDermott Co., Franklin, Mass.; increases at the Farr Alpaca Co., Holyoke, Mass.; new weave shed and machinery increases at the Taylor Manufacturing Co., Northboro, Mass.; enlargement at the Botany Worsted Mills, Passaic, N. J.; new yarn and weaving machinery at Shuttleworth Bros. Co., Amsterdam, N. Y.; enlargements at Chatham Manufacturing Co., Elkin, N. C.; new building and machinery increases at Oregon City (Ore.) Manufacturing Co.; new mill and dyehouse, with weave room equipped with automatic looms, at the Bellevue Worsted Mills, Philadelphia; branch mill established by James Lees & Sons Co., at Philadelphia; the new million-dollar plant of S. B. & B. W. Fleisher, Inc., Philadelphia; new mill and boiler house for the Woonsocket (R. I.) Spinning Co., Inc.; additions to the Island Woolen Co., at Baraboo, Wis., and general reconstruction and doubling of the plant of the Prairie du Chien (Wis.) Woolen Mills Co.

NEW KNITTING MILLS

The knitting industry maintains its position as the fastest growing branch of the textile industry in number of new establishments, in spite of the fact that there are only 97 new projects reported in 1917, as against 113 in 1916, and an average of 110 for the last ten years. Difficulty in securing machinery and supplies is undoubtedly responsible for the reduced figures. The larger number of the new mills are located in the Southern States, there being 47 new plants, chiefly hosiery projects, in this section. North Carolina alone accounts for 25 of this number and Tennessee is second with 12. Pennsylvania has the largest number of new knitting mills of any state with 26, but it is noticeable that the South is gaining on the Middle Atlantic group of states as a factor in the knitting industry.

Some of the important new mills are the Glenn Hosiery Mills Co., Mobile, Ala.; the Mitchell Hosiery Co., Columbus, Ga.; Parker Hosiery Mills & Dye Works, Frostburg, Md.; Asheboro Hosiery Mills, Asheboro, N. C.; Standard Knitting Mills, Inc., Gastonia, N. C.; Surry Hosiery Mills, Mount Airy, N. C.; Jewell Knitting Mills, Inc., Statesville, N. C.; Superior Underwear Co., Piqua, O.; Lincoln Hosiery Mills, Philadelphia; Triangle Textile Co., Reading, Pa.; Lookout Knitting Mills, Chattanooga, Tenn.; Sunshine Hosiery Mills, Chattanooga, Tenn.; Kingsport (Tenn.) Mills Co.

Some of the important enlargements and improvements are as follows: New departments established by the Black Cat Textiles Co. at Sheboygan, Wis.; and Harvard, Ill., and a large building constructed by the same concern at Bennington, Vt., where an additional plant has been acquired; new buildings and equipment for the Paramount Knitting Co., of Chicago; a large increase at the Atlas Underwear Co., Richmond, O.; new building and machinery at Joseph Roth & Co., Toledo, O.; plant at Lackawanna Mills at Scranton doubled; enlargement at Interwoven Mills, Martinsburg, W. Va.; new six-story building and a one-story dyehouse for Holeproof Hosiery Co., Milwaukee, and a new seven-story building for the Phoenix Knitting Works, Inc., Milwaukee.

THE SILK INDUSTRY

The silk industry continues to concentrate in New Jersey and Pennsylvania, these two states having a total of 66 of the 96 new mills reported. Paterson alone has 38 new silk mill projects, most of them being broad silk weaving plants of a few looms located in tenement mills. Some of the important new projects are the National Spun Silk Co., New Bedford, Mass.; Lawrence Silk Mills, Paterson, N. J.; Northern Silk Mills, Paterson; Andover Silk Co., Depew, N. Y.; A. P. Villa & Bros., Erwin, Tenn.; Kahn & Feldman, Parkersburg, W. Va. Some of the important enlargements and improvements are at the Rossie Velvet Co., Willimantic, Conn.; Oscar Heineman Co., Chicago; Champlain Silk Mills, Whitehall, N. Y.; Gudebrod Bros. Silk Co., Pottstown, Pa.; Stroudsburg (Pa.) Ribbon Mills; Oswegatchie Textile Co., Pawtucket, R. I.

MISCELLANEOUS NEW MILLS

Among the miscellaneous new mills there are 16 plants for dyeing, bleaching, finishing, printing, mercerizing, or otherwise processing textile products in various forms. The demands for the products of raw stock bleaching and cotton nitrating plants seem to be adequately supplied by the concerns that went into this work before our entrance into the war. Only one new plant engaged in this line seems to have got under way during the year.

The detailed report of new mills, important changes, enlargements and improvements follows:

Details of Mill Construction

NEW COTTON MILLS

Alabama, Alexander City. The Roberta Mills; high-grade underwear yarns, 28s to 30s; 5,000 spindles. (Branch of the Russell Mfg. Co.)

Anniston. The Perkins Mfg. Co.; N. S. Perkins, pres. and treas.; N. C. Richardson, supt.; Towels and Novelty Weaves.

Connecticut, Norwich. Max Pollack & Co., Conantville, Conn.; threads; starts new branch in leased building; W. L. Nichols, mgr.; 136 spindles, number to be increased.

North Stonington. Laurel Glen Line Co.; $25,000; Charles F. Ecclestone, pres.; Ralph M. Briggs, treas. and buyer; F. L. Powell, gen. mgr., agent and supt.; round braids and fish lines; 170 braiding machines, 3,176 spindles; water; sell direct.

Georgia, Atlanta. United States Penitentiary. Fred Zerbst, warden; building plant for manufacture of cotton duck for use in mail bags, etc. Congress appropriated $129,500 for this purpose.

Illinois, Chicago. The Chicago Yarn Processing Co.; 1643 Van Buren St.; Edward Frieder, pres.; Fred Friedlander, treas.; E. J. Vavrinck, supt.; winding.

Indiana, Wabash. Perfection Tire & Rubber Co.; tire and asbestos cloths; 6 mules, 1 ring spindles, 15 looms, 9 sets cards; F. E. Humphrey, Fort Madison, pres.; T. W. Cole, Chicago, treas. and buyer. (Branch of Chicago plant.)

Massachusetts, Boston. Tate Mfg. Co., Inc.; wire and cotton cordage and mops; A. Haas, pres.; C. A. Haas, treas.

East Pepperell. Pepperell Braiding Co.; $25,000; Webster K. Clark, pres.; E. S. Judkins, treas.; braids; purchased old mill.

Holyoke. Holyoke Braiding Co.; $45,000; Geo. C. Watson, pres. and treas.; W. L. Van Valkenburg, sec. and mgr.; Herbert Holt, supt.; Shoe and Corset Laces and Braids; electric; sell direct; buy 40/2 CP; 30/2 and 8/3 cotton yarn.

Hudson. Hudson Narow Fabrics Co.; Ernest Hall, mgr.; non-elastic tapes; equipped Thomas Taylor & Son's plant with 8 looms (working on dobule shift).

Malden. Multiple Winding Co.; S. F. Brown, pres.; J. B. Jamieson, treas.; Yarns for Electrical Insulation; also job winding from skein or cops, cones or tubes; sell direct; electric.

New Bedford. Penrod Mills; $600,000; J. Armitage, pres.; R. M. Donaldson, treas.; Myron C. Taylor, chairman; Maning Emery, Jr., supt.; Combed Sea Island and

ANY KIND OF COAL

whether it is anthracite culm, screenings, river coal, barley, rice or bituminous slack, coke breeze, etc.,

WILL BE AS GOOD OR BETTER

than high grades of soft or hard coal with your Present Boilers.

IF YOU INSTALL A COE TURBO BLOWER

These are the advantages of the

COE TURBO BLOWER

when installed as per sketch:

1. **Even the lowest grade of coal will have to surrender its entire combustible** if a thorough mixture with sufficient air is effected by a COE TURBO BLOWER.

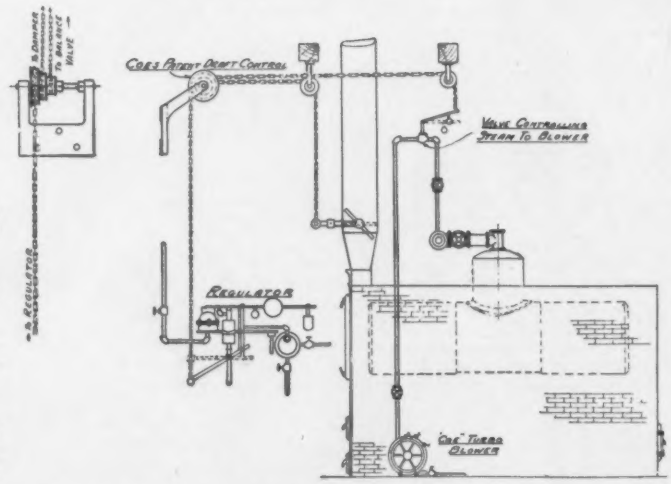
2. **There cannot be any "poor draft,"** caused by an inadequate chimney, disadvantageous flues or unfavorable weather conditions when the COE TURBO BLOWER is installed.

3. **The output of your plant has probably increased,** but to increase the capacity of your boilers you cannot burn more coal efficiently unless you provide for proportionately more air.

4. **To maintain a uniform steam pressure** is what your fireman is endeavoring to do now, though the load on your boilers may vary considerably at times. The COE TURBO BLOWER connected to your damper regulator as shown in sketch will **entirely automatically** start up, change its speed, or stop, according to what the pressure gauge on your boiler records.

5. There is considerable heat lost to you when permitted to escape with your exit gases through a partly or entirely opened stack damper. **The COE TURBO BLOWER operates with a permanently checked stack damper, thereby recovering the heat that would otherwise pass out.**

6. **The COE TURBO BLOWER** uses only a fraction of the amount of steam a jet blower would use, and the exhaust, being discharged into your ashpit, **will preserve your grates considerably.**

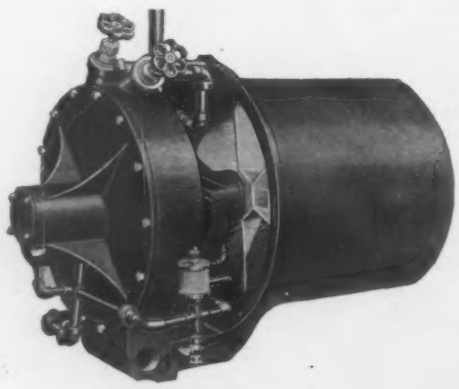


7. By supplying sufficient draft under all weather conditions, YOUR SMOKE WILL BE ELIMINATED OR GREATLY REDUCED.

8. **Your present grates do not have to be changed** as long as a mixture of your present coal and any other fuel is used.

If installation cannot be made on side wall of boilers, **send us a sketch of the plan view of your boilers** and we will find the best way to make installation.

Installation often could be made while boiler is in operation at a fraction of the expense a stoker would cost you.



Try A Coe Turbo Blower Now on One of Your Boilers!

Ask for copy of "POSSIBILITIES FOR CUTTING DOWN COAL BILLS," published on page 288 of the Annual Review Number 1917 of this Journal, dealing with the COE TURBO BLOWER exhaustively.

Read excerpts of letters we are getting daily:—

"Since using your turbo blowers we are able to operate our boilers on 50% of culm and 50% of bituminous coal, instead of all-bituminous coal as we were doing before we had your machines. We realize that we could use even more than 50% culm, provided we used grates suitable for this small size coal. We also found that with your machines we can considerably increase the capacity of our boilers, even under unfavorable weather conditions."—THE JOHN ILLINGWORTH STEEL CO.

"Whereas formerly we used nothing but the very best of bituminous coal and had to push the boilers, we now use 50% of bituminous and 50% culm and have less trouble in keeping up steam than we had previous to the installation."—ROOSEVELT WORSTED MILLS.

FOR FURTHER INFORMATION WRITE TO

EUGENE HAHN, 709 Harrison Bldg., Philadelphia, Pa.

Agent for C. T. COE CO., Newark, N. J.

Egyptian Yarns and Fabrics; Taylor Armitage & Co., New York, selling agent. (Buying done at New York office, 120 Broadway.)

Palmer. Dean & Sherk, of Detroit, Mich., started new branch in renovated building, making shoe threads.

Swampscott. Hackett & Bateman, 324 Essex St.; Low Cotton Yarns from Waste; sell direct.

Walpole. Hancock Waste Co.; A. E. Glennon, treas. and buyer; Joseph Perry, supt.; Cotton Waste; 3 shredders, 2 pickers, 1 cutter; electric; sell direct.

New Jersey, Paterson. Liberty Belting Mills, 126 Market St.; $30,000; woven and canvas belting and lining.

Union. P. L. G. Embroidery Works, Inc.; $7,500; Embroideries, Laces, etc.

West Hoboken. Hudson Embroidery Corp., 408 West St.; $5,000; Embroideries and Laces.

New York, Cohoes. Little Falls Fiber Co.; leased Massasoit Mill; glazed wadding; S. L. Munson, supt. (Branch of Little Falls.)

McGraw. McGraw Mfg. Co.; Shoe and Corset Laces; 114 braiders.

New York. Phoenix Yarn Corpn.; $30,000; Sam'l Gordon, pres. and treas.; I. Beck, supt.; 8/1 to 120/2 yarns; 6 coners; 6 double tubers, 4 60-spindle winders; electric; sell direct. (Sell merc. cotton yarns all description, for knitting and embroidery trade.)

North Carolina, Avondale. Haynes Mills (P. O. address, Henrietta); R. R. Haynes, pres.; Z. O. Jenkins, treas. and buyer; Cotton Cloth; 20,000 spindles, 350 looms; electric. (New weave shed erected 320 x 100 feet, brick.)

Charlotte. The Piedmont Commission Company; $35,000; W. H. Belk, pres.; Geo. H. Brockenbrough, Jr., treas.; Damasks and Towels; 12 broad and 150 narrow looms; electric; sell direct; buy 8 to 16s yarn. (New building erected.)

Gastonia. The Mutual Cotton Mills; $200,000; C. B. Armstrong, pres. and treas.; B. F. S. Austin, vice-pres.; W. Ralph Armstrong, sec.; A. K. Winget, asst. treas.; Lee Smith, supt.; 24s Hosiery Yarns; 5,500 spindles.

Gastonia. The New Hanover Thread Mills; $250,000; W. T. Rankin, pres.; J. L. Bush, sec.; Combed Yarns; 4,000 spindles.

Gastonia. The Ranlo Manufacturing Co. (Ranlo); $500,000; John C. Rankin, pres.; C. B. Gray, vice-pres.; W. T. Love, sec. and treas.; Fine Combed Yarns; 6,000 spindles. (Erected new buildings; main mill 400 x 132 feet.)

Gastonia. Smyre Mfg. Co.; $250,000; J. Lee Robinson, pres.; J. O. White, vice-pres.; Fred L. Smyre, sec. and treas.; M. Dilling, supt.; Fine Combed Yarns, 50s to 80s; 10,000 spindles; electric; Messrs. Smyre and White, buyers. (New buildings erected.)

Hickory. The Hickory Spinning Co.; $150,000; G. N. Hutton, pres.; J. D. Elliott, vice-pres.; H. J. Holbrook, sec. and treas.; Cotton Yarns; 5,100 spindles. (Erected new building.)

High Point. Moffitt Cotton Mills; H. A. Moffitt, gen. mgr.; Yarns; 5,000 spindles; motor; daily capacity 2,000 lbs. yarn. (New building erected, 235 x 85 feet, one story, brick.)

Leaksville. Wearwell Bedspread Mill; Bedspreads; new building erected, 390 x 290 feet; 10,200 spindles and 176 broad Jacquard looms installed.

Salisbury. Ivy Damask Mills, Inc.; $50,000; R. Lee Mahaley, pres.; T. B. Marsh, treas., gen'l mgr. and buyer; Damasks; 24 wide looms; electric; buy 26s, 18s yarn; D. D. Campbell (N. Y.), selling agent. (New building erected.)

Shelby. Catherine Mills Co.; $15,000; C. C. Blanton, pres.; J. R. Dover, sec., treas.; C. C. Cobb, mgr.; J. R. Dover, Jr., supt.; Cloth Specialties; Duck; 40 looms; electric; Farish Co., N. Y., selling agents; buy 20s, 2-ply.

Shelby. The Liberty Spinning Co.; $150,000; C. G. Blanton, pres.; J. R. Moore, sec.; A. M. Hamilton, mgr.; 2-ply Cotton Yarn; 5,000 spindles.

Pennsylvania, Clifton Heights. The Clifton Cotton Yarn Mills; Eric Beyer, mgr. and sole agent; Cotton Yarns; 4,000 spindles; electric; sell direct.

Johnstown. Specialty Mattress Co.; new building erected; Mattress Felts. (Branch of Toledo, O.)

Philadelphia. American Twine Co., 2915 Ridge Ave.; Twines, Polished Thread, etc.; sell direct; Chas. Salkend, buyer; buy 8/4 cotton, etc., single and ply.

Philadelphia. The Alvin Beaming Co., 1717 Gillingham St., Frankford; all kinds Plain and Fancy Beaming; 6 beaming frames, 1 splitter.

Philadelphia. Wm. A. Coyle, Mascher and York Sts.; Turkish Towels, Bar, Dish and Scrub Cloths; 14 narrow looms, 2 sewing machines; sell direct.

Philadelphia. Frankford Textile Mills, 1721 Gillingham St.; $10,000; James L. Thackeray, pres.; J. Lincoln Thackeray, sec. and treas.; Upholstery Goods and Mitcheline Spreads; 12 looms; steam.

Philadelphia. The Glenwood Mfg. Co.; John R. Mawson, pres.; Hair Cloth made with special process; 12 broad looms.

Reading. L. & G. Belting Co.; incorporated to manufacture cotton belting; H. W. and D. H. Gruber, West Leesport, Pa., mentioned as interested.

So. Langhorne. Joseph H. Bromley (Phila.) is to establish a lace plant at this place.

South Langhorne. North American Lace Co.; Levers laces; C. T. Rodgers, supt. (New branch of Philadelphia.)

York. Alb. & E. Henkels, Inc. (Bridgeport, Conn.); Laces and Trimmings; equipped building formerly occupied by Edna Silk Mill for Cotton Tapes.

Rhode Island, Apponaug. Narragansett Cotton Mills, Inc.; $200,000; Andrew E. Johnson, pres.; Claus Hansen, treas.; automobile tire fabrics; 30 looms; weave shed 12,000 square feet; additions to be built later.

Pawtucket. Anchor Webbing Co.; leased Blackstone Webbing Co. plant and added 15 looms; erected 140 x 40 ft. one-story addition; also $8,000 office building. (Branch of Woonsocket.)

Pawtucket. New England Lace Co. (Bromley interests of Philadelphia); built new mill 230 by 100 feet, two stories; George Truman, supt.

South Carolina, Cheraw. Cheraw Cotton Mills; $200,000; Robert Chapman, pres. and treas.; carded hosiery yarns; 5,200 spindles; Franklin D'Olier & Co., selling agents; electric; (built 325 by 104 foot mill.)

Texas, Dallas. Dallas Cotton & Linter Co.; Tom B. Burnett, pres.; Comfort Batts, Cotton Felt., etc. (Erected new building, 200 by 100 feet.)

Houston. Houston Waste Mills; $10,000; Cotton and Woolen Waste.

Tennessee, Knoxville. Cherokee Spinning Co.; new mill, 207 by 132 feet; 5,040 spindles; 20 spinning frames; electric power; vacuum system air washing installation; 40s-80s combed peeler yarn; 6,000 pounds weekly capacity.

NEW WOOLEN MILLS

California, Eureka. Woolknit Mills; $1,000,000; Harry H. Bair, pres.; Wm. B. Wightman, treas.; J. W. Clark, supt.; T. C. Boone, buyer; blankets, mackinaws and flannels; electric; 3 sets cards; 20 looms; dye house.

Santa Ana. Mission Woolen Manufacturing Co.; $74,000; A. E. Bennett, pres.; L. M. Doyle, treas.; J. F. McAfee, supt. and buyer; cassimeres and blankets; 2 sets of cards; 15 broad looms; steam; sell direct.

Connecticut, Norwich. Norwich Woolen Co.; $1,000,000; Charles Kaye, pres.; Emmanuel Kaplan, treas.; George Taylor, supt.; Millbrook Woolen Mill Co., New York, selling agents. Cloakings, overcoatings and suitings; 21 sets cards; 60 looms; 20 special weaving machines. Constructed new mill; dyehouse; electric power.

Illinois, Elmhurst. Frank A. Green; woolen, cotton and jute shoddy; electric; sell direct. New building erected and equipped.

Massachusetts, Auburn. Auburn Worsted Co.; $500,000; Edgar T. Wood, pres.; William H. Harris, treas.; leased Ettrick Mills; worsted yarns; 4 combs; 3 cards; 2,200 spindles.

Boston. William White Wool Dusting Mill. (Erected new brick building, 53 by 130 feet.)

Hyde Park. Eastern Wool Co.; Walker, Searle & Co., Boston, owners; experimenting on knitting yarns for owners.

North Cambridge. Beckwith Box Toe Co.; new plant to manufacture felts for Company's own use; 14 cards. Albert Crabtree, mgr.

Worcester. Smith Yarn Mill, Inc.; $25,000; Clarence W. Smith, pres.; Ernest E. Smith, treas; woolen and merino yarns; 4 sets of cards; (leased building.)

New Jersey, Newark. American Hair Felt Co., Milwaukee, Wis. and Sharpsburg, Pa., start branch plant; manufacture hair and wool felts.

New York, Beacon. Braeburn Woolen Co., Inc.; $500,000; John McLaren, pres.; Cornelius McLaren, treas.; cassimeres, suitings, thibets and meltons; mill 150 by 150 feet; cost $30,000; also dyehouse.

Dryden. Atlantic Woolen Mills, Inc.; $50,000; Solomon Bernstein, pres.; Louis Bernstein, treas.; Fine Woolen Shoddy; 11 sets of cards, 6 pickers.

Ohio, Cleveland. The Colonial Woolen Mills Co.; $100,000; J. N. Hahn, pres.; W. S. Ratzenmeyer, vice-pres.; John T. Feighan, sec. and treas.; blankets, mackinaws, sterotypers' dryers, auto. robes and shawls; erected new building, 84 by 125 feet. (Also operate branch plant at Apollo, Pa.)

Oregon, Portland. Oregon Wool Scouring Mills; $40,000; W. L. Crowe, pres. and buyer; N. W. Downard, treas. (Erected new building.)

Pennsylvania, Bloomsburg. Bloomsburg Worsted Spinning Mills; C. H. Sharpies, pres.; has purchased 2-story brick building, 120 by 50 feet and one 110 by 50 feet, 1 story; 2 sets drawing; 4 spinning frames; electric drive. T. Williams, mgr.

Bridgeport. Energetic Worsted Mills; John J. Hosey, mgr. and supt.; Worsted Yarns for Weaving and Knitting (Bradford), up to 2/40s; Shuttle Bobbins, Skeins and Dresser Spools; 1,600 spindles; electric; sell direct.

Mifflin. Royal Rug Mills; John G. Clements (408 No. Second Street, Phila.), sole prop.; Rag Carpets and Rugs; 30 looms; steam; dye; sell direct; buy yarns in skeins, spools and warped. (Leased building.)

Philadelphia. Fred Bartel, Unity and Leiper Sts.; Men's Worsted Wear and Dress Goods; 20 broad looms.

Philadelphia. Eick Worsted Co.; A St. and Indiana Ave.; Woolen and Worsted Dress Goods, and Cotton Novelties; sell direct.

Philadelphia. Wm. W. Oursler; 5817 Walker St. (Wissinoming); Men's and Women's Suitings, Worsted and Cotton; 10 looms; gas engine. (Commission weaving at present.)

Rhode Island, East Greenwich. Greenwich Mills; Granville A. Beals, prop.; Fred S. Brewster, supt.; woolens and Worsteds for men's wear; 194 broad looms; electric; sell direct. (New York office, 229 Fourth Ave.)

Warren. Narragansett Worsted Mills of American Woolen Co.; yarns for filling and warp; Henry Wood, agent. (Took over Warren Worsted Co. plant.)

Westerly. Federal Felting Co.; erecting 50 by 147 feet two story mill. (Branch of Clark's Falls, Conn.)

Tennessee, Morristown. Morristown Blanket Mills; $50,000; woolen blankets; $18,000 equipment; new two-story brick mill, costing $10,000, leased.

Utah, Beaver. Beaver Woolen Mills Co.; $50,000; James Yardley, pres.; R. H. Barton, treas.; Thos. Sumner, genl. mgr. and supt.; Blankets, Flannels, Smelter Cloths; 2 sets, 10 looms; water.

Wisconsin, Milwaukee. Isaac Barnett Woolen Mills Co.; 490 Virginia St.; Wool Extracts, Shoddy and Wool Waste; Carbonizing, etc.; 5 cards, 2 pickers, 1 garnett; dye stock.

NEW KNITTING MILLS

Alabama, Birmingham. The Buster Brown Hosiery Mills, No. 9 (branch of United Hosiery Mills Corp., Chattanooga, Tenn.) Children's Hosiery.

Decatur. Decatur Hosiery Mills; high grade 220 needle Seamless Half Hose; 60 knitting machines; 20 loopers; 10 ribbers. Goods finished at Chattanooga, Tenn. (Branch of the Nick-a-Jack Hosiery Mills); remodeled standing building for plant.

Gadsden. The Davis & Allcott Co.; W. B. Davis, pres.; Chas. Allcott, treas. and buyer; Children's Cotton Hosiery; 250 knitters, 50 sewing machines, 6 loopers; electric; dyehouse; James Jamison & Co., selling agents.

Mobile. Glenn Hosiery Mills Co., 10-12 Emanuel St.; $100,000; J. F. Carter, Jr., pres., treas. and buyer; A. M. Slack, supt.; Ladies' 200 and 220 needle Hosiery; 176 needle Half Hose; 80 knitting and 10 sewing machines; gas power; dye.

California, Pomona. A. M. Fowkes; Sweaters and Sweater Coats; 2 knitters, 2 sewing machines.

San Francisco. Princeton Knitting Mills, $25,000; V. E. Burdell, pres.; Wm. R. Weber, vice-pres.; T. C. Westdin, treas.; Wm. R. Weber, buyer; Knit Goods; electric.

Connecticut, Norfolk. Winsted Hosiery Co., new branch; old building leased, machines moved from Springfield branch; knitting, looping and mending only.

Delaware, Wilmington. Glen Hosiery Co., 13th and Poplar Sts.; $100,000; Clarence Prettyman, pres.; Chas. B. Prettyman, treas.; C. R. Prettyman, supt.; Seamless Half Hose and Women's Seamless Hosiery; 176, 188 and 200 needle; 304 latch needle knitting machines; 45 ribbers; 27 loopers; 80 sewing machines; dye and finish; steam; sell direct, and through J. S. Tapscott, Balt., L. I. Farrin, Phila. and New York; sell jobbers; Clarence Prettyman buyer; buys 13s to 70s.

Georgia, Columbus. Mitchell Hosiery Co.; $200,000; John A. Mitchell, pres.; John A. Mitchell, Jr., treas.; E. C. Kennedy, supt.; Men's and Women's Hose; 60 knitting machines; 4 sewing machines; bleaching and dyeing; sell direct.

Dalton. Dalton Hosiery Mills; $25,000; J. S. Hall, pres.; H. J. Smith, vice-pres.; G. R. Westcott, secy.-treas.; 60 knitters; electric; capacity, 600 dozen whole and half hose per day; leased building.

Marietta. Kennesaw Hosiery Co.; $40,000; B. G. Brumby, pres. and buyer; W. M. Murray, treas.; Men's Half Hose; daily capacity, 500 pairs; John M. Given, selling agent; building leased.

Illinois, Chicago. Thos. E. Wilson & Co., 1422 W. Randolph St.; Sweaters, Toques, Jerseys and Bathing Suits; A. Hezinger, supt.; 64 knitting machines and 60 sewing machines; electric; sell direct; (carry worsted, wool and cotton.)

Harvard. Black Cat Textiles Co., new branch for 200 needle half hose.

Moline. J. P. Fleming, 1702 Third Ave.; Sweaters; 9 knitting machines; electric; sell direct.

Peoria. Lehman, Williams Co., R. J. Seeds, supt.; high grade style specialties in Knitted Fabrics, Bathing Suits, for women and men, of worsted.

Sparta. Chester Knitting Mill, St. Louis, Mo., branch mill, established here; cotton, hosiery and dyeing done at main plant.

Indiana, South Bend. Hastings Textile Manufacturing Co.; Horace Hastings, pres.; L. H. Hastings, treas.; hosiery and knit goods; 30 knitting machines, electrically driven.

Michigan, Detroit. Republic Knitting Mills; $50,000; Edwin A. Wolf, pres.; Herbert D. Robinson, treas.; Woolen Hosiery and Gloves; 75 knitting machines, 2 sewing machines; electric; Robt. P. Steele & Co., New York, selling agents.

Zeeland. Van Lopik Knitting Co.; G. Van Lopik, sole proprietor; Knitted Head Wear; 11 knitintg machines; 3 sewing machines; electric; sell direct.

New Hampshire, Belmont. Ipswich Mills; new branch for Seamless Cotton Hosiery; dye and finish.

New Jersey, West Hoboken. Central Hosiery Manufacturing Co.; Women's Mercerized and Silk Hosiery; 10 220-needle knitting machines; 2 sewing machines; electric drive.

New York, Brooklyn. Premier Knitting Mills, Inc., 97 Montrose Ave.; $5,000; Nathan Kaplan, pres.; Irving Saltzman, treas. and buyer; Ladies' Sweaters and Novelties; 10 knitting and 8 sewing machines; 1 54-inch Brush machine; 1 winder; sell direct; buy Zephyr 2/18, 2/30, wor-2/18.

Brooklyn. Venice Underwear Mills, Inc.; 40 Penn St.; B. Saidin, pres.; M. Saidin, treas., supt. and buyer; Ladies' Knit Vests and Union Suits; 15 knitting and 10 sewing machines; steam; sell direct. Buy 26/1, 28/1, 30/1 yarn.

New York. Artistic Neckwear Co. (Atlas Knitting Mills), 79 E. 130th St.; Women's Sweaters; 25 knitting and 15 sewing machines. Sell direct.

New York. Horn, Schulein & Friedman, Inc., 91-93 Fifth Ave.; Infants', Children's, Misses' and Ladies' Fancy Knit Goods; 30 knitting and 22 sewing machines; sell direct.

Syracuse. Vulcan Glove Co., Inc.; $5,000; formed to operate branch plant of Vulcan Knitting Mills, Weedsport, N. Y.; 30 sewing machines.

Utica. Clark Knitting Co.; $21,000; Thomas A. Clark, pres.; C. J. Richards, treas.; Women's, Men's and Childrens Cotton Knit Underwear; 25 knitting, 100 sewing machines; electric power.

North Carolina, Asheboro. Asheboro Hosiery Mills; $125,000; Virgil Presnell, pres.; C. C. Cranford, treas. and buyer; Chas. B. Maxfield, supt.; Hosiery; 50 knitting machines; dye; electric; Jno. M. Given & Co., selling agents. (Buy 20 carded 27 and 32 yarn.)

Atkinson. Atkinson Hosiery Mills Co.; $100,000; E. A. Hawes, Sr., pres.; E. A. Hawes, Jr., treas. and sec.; J. T. Haggard, vice-pres. and gen. mgr.; J. Flynn, supt.; Men's Half Hose; 31 knitting machines, 5 loopers; steam; sell direct in gray; J. T. Haggard, buyer.

Burlington. The Curlo Hosiery Mills; W. C. Thurston; J. J. Jenkins, supt.; Hosiery and Glove Tubing; 20 knitting and 8 sewing machines; electricity; sell direct; buy 14/1, 20/1 yarn; capacity 66 doz. pair hosiery, 100 lbs. tubing per day.

Charlotte. Charlotte Knitting Co.; J. H. Cutter, pres.; Geo. B. Hiss, vice-pres.; R. J. Walker, sec. and treas.; B. N. Barnes, supt.; Men's and Women's Hosiery; 50 knitting machines; dye; electric; Chas. Chipman's Sons Co., selling agents.

Cherryville. Gaston Knitting Mills, Inc.; $100,000; N. B. Kendrick, pres.; A. B. Cook, treas. and manager; Men's Half Hose, 176-needle; 25 knitting and 1 sewing machines; electric; (rented building).

Claremont. Claremont Hosiery Mills Co., Inc.; $6,000; R. L. Connor, pres.; C. S. Grove (Hickory), treas. and buyer; Men's, Ladies' and Infants' Hosiery; 34 knitting and 5 sewing machines; oil engine; sell direct; (office at Hickory); new building erected.

Conover. The Herman Glove Co.; C. C. Herman, supt.; Men's Knitted Wrist Canvas Gloves; electric; sell direct; Preston Herman, buyer; buy hosiery yarn 14/1.

Durham. Louise Knitting Mills of East Durham, established branch plant here; 24 knitting machines, 10 loopers, 10 ribbers; electric (leased building).

Elizabeth City. Ideal Hosiery Co.; M. G. Morrisette, pres.; M. B. Simpson, treas.; W. H. Sanders, supt. and buyer; 200-needle Half Hose; 12 knitting machines; electric; sell through agents; buy combed yarn, 20, 26, 70, 80/1; (new building erected).

Ellerbe. The Ellerbe Knitting Mills; $25,000; W. L. Howell, pres.; B. B. Farlow, vice-pres.; J. R. Bennett, sec.-treas.; Women's Hosiery; 50 knitting machines; steam.

Gastonia. Standard Knitting Mills, Inc.; $100,000; W. S. Adams, pres.; M. A. Turner, vice-pres.; G. R. Spencer, sec.-treas.; Men's 176 Needle Half Hose; 50 knitting machines; electricity; sell direct; buy 14, 18 and 26 carded yarn.

Graham. The White Cotton Co.; $25,000; Wm. White, pres.-buyer; S. S. Holt, treas.; Knit Tubing; 50 ribbers; electric; buy 11 yarn.

Greensboro. Latham Mills, Inc.; $250,000; J. E. Latham, pres.; R. D. Douglas, treas.; Men's Half Hose; 100 knitting machines, 1 sewing machine; electric and steam; piece dye house.

Haw River. Riverside Hosiery Mills, Inc.; $10,000; J. A. Long, pres.; R. K. Lashley, treas.; Mercerized Half Hose; 30 knitting machines; electric.

Holly Bush. Holly Bush Knitting Mills; C. T. Morrison and C. S. Grove; Hosiery; 40 knitting machines; steam; offices at Hickory, N. C.

Lawndale. Piedmont Hosiery Mills Co.; $50,000; W. R. Newton, pres.; Decatur Elmore, vice-pres.; Hosiery; capacity 200 doz. per day; 20 knitting machines; electric.

Lenoir. Lenoir Hosiery Mills; $50,000; F. R. Moore, pres.-treas. and buyer; Joe C. Moore, sec.; 84 needle Half Hose and Ladies' Hosiery, 220 and 240 needle; sell goods outside of half hose in the grey. Purchased equipment of the Virgilina (Va.) Hosiery Mills, and added 39 new knitting machines, making total of 56, with 2 sewing machines.

Lillington. The Lillington Hosiery Mill Co.; $10,000; E. T. Spence, pres.; A. M. Shaw, vice-pres.; Hosiery.

Morganton. Garrou Knitting Mills; $150,000; John L. Garrou, pres. and buyer; J. M. Brinkley, treas.; Ladies' Hose; steam, dye.

Mount Airy. Surry Hosiery Mills; $200,000; George O. Graves, pres.; G. C. Loverill and I. W. Barber, vice-presidents; L. C. Chrustman, sec.-treas.; Hosiery; 50 knitting machines. (Purchased a standing building.)

Shelby. Blanche Hosiery Mills; (J. G. Dudley and Garland McBreyer, interested); Hosiery; 10 knitting machines.

Statesville. Queen Knitting Mill; $100,000; F. B. Bunch, pres. and treas.; hosiery; 100 knitting machines; 8 loopers; 3 sewing machines. (New building erected.)

Valdese. The Liberty Hosiery Mills; $50,000; J. L. Garrou, pres.; Francis Garrou, treas.; Ladies' Cotton Hosiery; electric.

Wilmington. People's Hosiery Mills; $100,000; E. Fred Banck, pres.; E. T. Burton, sec.-treas. (To erect new mill buildings.)

Ohio, Columbus. Geo. R. Shoemaker Co., 37 N. 3d St.; Surgical Elastic Hosiery, Ab-

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dominal Supporters, Knit Cloth Mesh; 5 hand knitting frames and 6 sewing machines; sell direct. Geo. R. Shoemaker, buyer; buy tram and spun silk, merc., and peeler cottons.

Oklahoma, Oklahoma City. The Paragon Knitting Mills; $250,000; Ladies' Hosiery; capacity 2,500 doz. pairs weekly.

Pennsylvania, Coaldale. Coaldale Hosiery Co.; $50,000.

Collettsville. Collettsville Hosiery Mill, Inc.; $100,000; J. G. Garrou, pres.; I. G. Green, treas.; hosiery; 40 or 50 knitters, 2 sewing machines (in process of organization).

Elizabethville. Collier, Ray C.; Men's Half Hosiery; electric. (New mill erected.)

Hamburg. The Burkey Underwear Co.; Shoesmakersville, Penn. To operate branch plant at this place; leased building; installed 12 body frames and 28 sewing machines.

Hamburg. Burks Underwear Co.; Women's Knit Underwear; 7 knitting and 8 sewing machines; electric; R. C. King & Co., selling agents.

Lincoln. Mohn Bros.; (Adamstown); Hosiery. Branch mill; new building erected; 45 knitting machines installed.

Linfield. Linfield Knitting Co.; Albert Weber, Jr., sole prop.; Samuel Reifsnyder, supt.; 176 needle Half Hose; 60 knitters, 16 loopers; electric; sell direct; Albert Weber, Jr., buyer. (New building erected.)

Palmyra. Joseph H. Kettering. (Purchased building vacated by Palmyra Knitting Mills); Half Hose; sell jobbers and commission houses; 20 knitting machines.

Philadelphia. The Arr-tee Knitting Mills; 147 N. 12th St.; (A. Titleman and M. Ribkin); M. Ribkin, supt.-buyer; Sweater Coats and Fancy Knit Goods; 18 flat and round knitting frames; 9 sewing machines; electric; buy worsted, woolen, merino and silk yarns.

Philadelphia. The Bardenhall Knitting Mills; (Geo. W. Bardens and Thos. E. Hall, props.); 5423-27 Germantown Ave.; Cardigan Jackets and Sweater Coats; 12 flat knitting and 8 sewing machines; sell direct; buy 8s and 20s two-ply worsted yarns.

Philadelphia. Dobson & Schoen, Adams Ave and Wingedocking St.; Men's and Women's Fine Hosiery; 30 knitting and 2 sewing machines, 2 loopers; L. I. Farren, Lafayette Bldg., Philadelphia, selling agent; buy merc. 40s to 60s, 2-ply yarns.

Philadelphia. Franklin Sweater Mills, 242 South 5th St., I. Warshauer and Arthur I. Livingstein; Sweater Coats, Silk and Artificial Silk; 12 round frames, 6 sewing machines; electric; finish; sells direct to jobbers; buy artificial silk and mercerized cotton.

Philadelphia. Germantown Hosiery Co., 5147 Germantown Ave.; J. Norman Tompkins, prop. and buyer; Ladies' Mercerized Hose; 34 knitting and 2 sewing machines; sell direct and Robert C. King Co., selling agents; buy combed peeler merc. yarns, 36 and 50 2-ply, 60s, 80s single.

Philadelphia. Lincoln Hosiery Mills, Allegheny Ave. and A St.; Louis Liveright, pres.; Max Richter, treas.; $100,000 Men's and Women's Silk Hosiery; 175 knitting machines, 15 sewing machines.

Philadelphia. Miller Knitting Co.; Chas. F. Miller, 1825 Bristol St.; Ladies' Union Suits; 8 latch knitting and 14 sewing machines; electric; Jonas B. Robitscher, New York, selling agent; Chas. F. Miller, buyer.

Philadelphia. North American Mfg. Co., 2246 So. Ninth St.; $10,000; Max Loomis, treas.; David Hoffman, mgr. and supt.; Renovating, Finishing and Jobbing Hosiery 12 sewing machines; electric; buy single and 2-ply yarns.

Philadelphia. Rockledge Hosiery Mill; Heaton & Wilson, props.; 108 Drake Ave.; Fox Chase; Herbert Heaton, mgr.; Chas. H. Everett, buyer; Ladies' Silk and Art. Silk Plaited Hosiery; 220-needle, 30 knitters, 5 loopers; steam; finish; sell direct.

Philadelphia. Way Bros. Mfg. Co., 619 Moore St.; Men's Underwear.

Pottsville. Sunlight Knitting Co.; Geo. A. Gunther, pres. and supt.; P. J. Hobin, treas.; Ladies' Fine Ribbed Vests; 7 knitting and 5 sewing machines; E. W. Parks, selling agent; buy yarns 24s to 30s; (new building erected).

Quakake. Victor Knitting Mills, Inc. (Tamaqua); Men's Half-Hose; 52 knitting machines; (branch mill).

Reading. C. Brown-Sailor, Tragle Bldg.; Misses' and Boys' Underwear; installed 50 machines.

Reading. Penn Hosiery Co., 701 Walnut St.; $6,000; E. R. Wicklein, pres. and buyer; Emanuel Loeb, treas.; Hosiery; 50 knitters; buy 18s, 20s, 70s cotton and 40s and 50s 2-ply merc. yarns.

Reading. Triangle Textile Co.; Ladies' Hose; 100 knitting machines, 2 sewing machines.

Royersford. Royersford Hosiery Co.; Seamless and Lace Hosiery for Men, Women and Children; 100 latch needle knitting machines, 20 loopers, 20 sewing machines; steam; Paul F. Unger, gen'l mgr.

Shamokin. West Branch Knitting Co. (Milton, Pa.); branch mill; Men's Fiber Hosiery; 40 knitting and 12 looping machines; dyeing and finishing done at main plant.

Sinking Spring. Sinking Spring Underwear Co.; $12,000; Geo. W. Beard, pres.; Geo. W. Bickel, sec. and mgr.; Wm. J. Johnston, treas.; Ladies' Swiss Ribbed Vests; buy yarns.

Rhode Island, Central Falls. Blackstone Stocking Co.; $60,000; A. H. Smith, pres. and treas.; Cashmere Half Hose; 60 knitting machines; electric; buys 16s to 40s single cotton yarns; erected new mill, (succeeds Blackstone Stocking Co., which dissolved).

mill, piece dye-house operated; electric power.

Cleveland. Knox Hosiery Mill; J. W. Bell, supt.; Half Hose; O. A. Knox, buyer; sell in gray.

Erwin. Erwin Knitting Mills; $10,000; H. G. Morrison, pres.; F. M. Kelly, sec.

Kingsport. Kingsport Mills Co., Inc.; $500,000; W. B. Davis, pres.; Robert E. Davis, vice-pres. and sec.; J. Fred Johnson, treas.; Men's and Women's Fine Gauge Hosiery; 350 knitting, 6 sewing machines, 50 ribbers and 60 loopers; electric power; new mill 300 x 60 feet, including dye house; cost $45,000.

Knoxville. Ashe Hosiery Mills; $25,000; J. J. Ashe, pres.; C. H. Bacon, vice-pres.; F. E. Haun, sec.; remodeled building 125 x 75 feet; 50 knitting machines, 32 ribbers and 12 loopers; Hosiery and other articles for infants.

Nashville. Hermitage Knitting Mills; $10,000; Men's Lisle Half Hose; 12 knitting machines, 2 ribbers, 2 loopers.

Oakdale. Oakdale Hosiery Mills; $10,000; C. J. Alley, pres.; S. N. Oakley, treas.; W. Y. Boswell, sec.; Hosiery; 70 knitting machines; new mill, 100 x 30 feet; cost $2,500.

Spring City. Spring City Hosiery Mill; $50,000; A. P. Haggard, pres.; J. F. Collins, treas.; A. B. Andrews, gen. mgr.; Ladies' Hosiery; erected new mill; electric drive.

Canada, Ontario, London. Penman's, Ltd.; branch plant; removal of hosiery department formerly conducted at Thoroid, Ont.; equipped with 100 knitting and 2 sewing machines; S. A. Lamontagne, supt.

Tamworth. Imperial Knitting Co.; H. W. Richardson, pres.; J. E. Mortimer, treas.; Hosiery and Underwear; purchased building and installed 20 knitting machines and 50 sewing machines; water and electric drive.

Toronto. Fillis, Irving & McFadden; new plant; Men's Fine Cashmere Socks; 12 knitting machines and 5 loopers; electric drive.

Quebec, Three Rivers. Vulcan Knitting Mills of Canada, Ltd.; $50,000; branch of

Paterson. Alpine Silk Co.; Harry Maisel, prop.; 12 looms.

Paterson. Anetta Silk Co., 462 East 19th St.; $10,000; S. Huptich, pres.; L. McCaulley, treas.; broad silks; 10 looms.

Paterson. Bestgrade Silk Co.; Broad Silks; 10 looms.

Paterson. Blum Silk Mills, Inc.; $15,000; Isidor Blum, prop.; Broad Silks; 160 spindles, 26 looms.

Paterson. Charles E. Bloom Silk Co.; $100,000; will occupy floor of S. U. M. Mill; Broad Silks; 56 looms; Harry Aronsohn, pres.; Charles E. Bloom, treas.; 20 additional looms on order.

Paterson. Canadian Silk Co.; 170 Main St.; 10 Broad Silk looms; S. Cohen in charge of plant.

Paterson. Canova Simone Silk Co.; $25,000; Tie and Dress Silks; Henry Canova, pres.; P. Simone, treas.; 100 spindles, 16 looms; commission work at present.

Paterson. City Star Silk Co.; $10,000; E. Cavona, pres.; Louis Long, treas.; occupies floor space in new Van Kirk Mill; Broad Silks; 10 looms.

Paterson. Harry C. Compton; Commission Weaving; 10 looms.

Paterson. Domestic Silk Co.; 14 broad looms on commission weaving; additional looms to be installed later.

Paterson. Durable Silk Co.; $30,000; Emanuel B. Bornstein, pres.; W. H. Jeffries, treas.; John W. Wilson, supt.; Broad Silks; 96 looms, 500 spindles.

Paterson. Finkelstein Bros.; 57 Albion Ave.; 10 broad silk looms.

Paterson. Theodore Fogel; 22 broad silk looms.

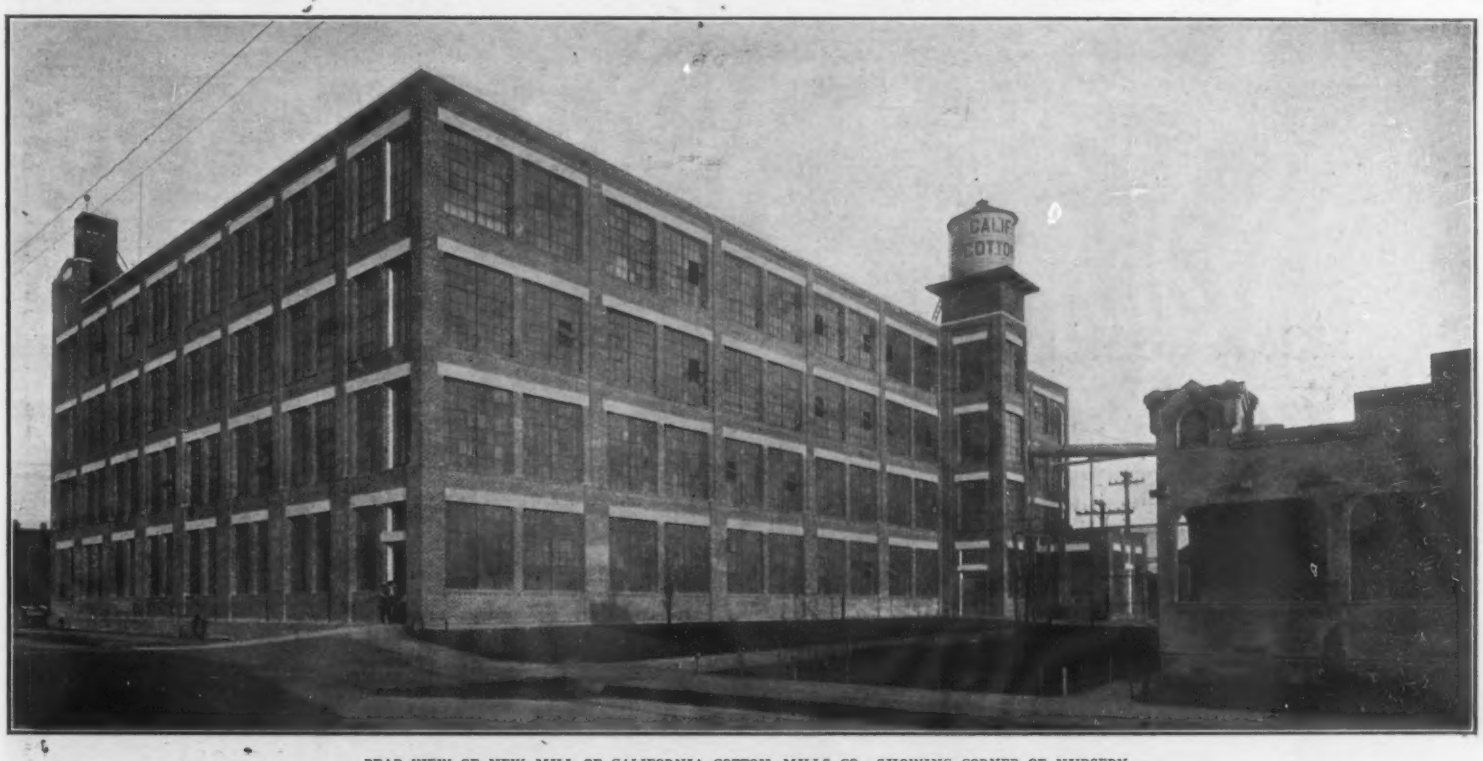
Paterson. G. & R. Silk Co.; $50,000; 60 looms; W. Cornforth, mgr.

Paterson. Geneva Silk Co.; $35,000; Paul Walder, pres.; broad silks; 10 looms.

Paterson. Goodman & Wadsworth; 30 looms.

Paterson. Gordon & Berner; Broad Silks; 28 looms; sell direct.

Paterson. Grabow Silk Co.; Max Grabow and John Grabow, props.; Broad Silks; 26 looms.



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Philadelphia. Dobson & Schoen, Adams Ave and Wingedocking St.; Men's and Women's Fine Hosiery; 30 knitting and 2 sewing machines, 2 loopers; L. I. Farren, Lafayette Bldg., Philadelphia, selling agent; buy merc. 40s to 60s, 2-ply yarns.

Philadelphia. Franklin Sweater Mills, 242 South 5th St., I. Warshauer and Arthur I. Livingstein; Sweater Coats, Silk and Artificial Silk; 12 round frames, 6 sewing machines; electric; finish; sells direct to jobbers; buy artificial silk and mercerized cotton.

Philadelphia. Germantown Hosiery Co., 5147 Germantown Ave.; J. Norman Tompkins, prop. and buyer; Ladies' Mercerized Hose; 34 knitting and 2 sewing machines; sell direct and Robert C. King Co., selling agents; buy combed peeler merc. yarns, 36 and 50 2-ply, 60s, 80s single.

Philadelphia. Lincoln Hosiery Mills, Allegheny Ave. and A St.; Louis Liveright, pres.; Max Richter, treas.; $100,000 Men's and Women's Silk Hosiery; 175 knitting machines, 15 sewing machines.

Philadelphia. Miller Knitting Co.; Chas. F. Miller, 1825 Bristol St.; Ladies' Union Suits; 8 latch knitting and 14 sewing machines; electric; Jonas B. Robitscher, New York, selling agent; Chas. F. Miller, buyer.

Philadelphia. North American Mfg. Co., 2246 So. Ninth St.; $10,000; Max Loomis, treas.; David Hoffman, mgr. and supt.; Renovating, Finishing and Jobbing Hosiery 12 sewing machines; electric; buy single and 2-ply yarns.

Providence. Pawtucket Hosiery Co.; branch plant; (space leased).

South Carolina, Anderson. Hetrick Hosiery Mills; branch plant; cement mill 115 x 50 ft.; 60 knitters, loopers and sewing machines; electric drive; daily capacity 300 dozen pairs of hose.

Marion. Daisy Glove Co.; C. F. James, mgr.; Canvas Gloves with knit wrists.

Tennessee, Athens. Chilhowee Mills; $50,000; H. A. Vestal, pres. and treas.; J. P. Vestal, vice-pres.; H. S. Moody, sec.; leased 110 x 28 foot building; will make additions; 40 knitters.

Bristol. Clinchfield Hosiery Mills; $500,000; Sherwood E. Hall, pres.; Edward C. Bailey, sec.

Chattanooga. Lookout Knitting Mills; $50,000; E. B. Thomasson, pres.; A. S. Revierie, vice-president.; E. M. Thomasson, sec.-treas.; Men's Union Suits; 12 knitting machines, sewing machines; electric drive; cost $30,000; leased three-story building 140 x 60 ft. for main mill and 50 x 20 foot dye house.

Chattanooga. Mountain City Knitting Mills; $15,000; J. B. Milligan, pres.; John M. Jones, vice-pres.; E. A. Magill, sec.-treas.; Hosiery; 56 knitting machines; electric drive; leased 60 x 50 foot 2-story building.

Chattanooga. Sunshine Hosiery Mills; $100,000; F. L. Chapman, pres. and treas.; F. J. Garant, mgr.; Infants' Hosiery; 150 knitting and 20 sewing machines; new

Weedsport, N. Y.; gloves; 50 machines installed on floor of Municipal Building.

Manitoba, Winnipeg. Superior Knitting Mills, Ltd.; $20,000; M. Steinberg, pres.; N. J. Weidman, treas.; Men's, Ladies' and Children's Sweaters, Toques, etc.; also 15s two-ply and three-ply yarns; 18 knitting machines and 12 sewing machines; electric drive.

NEW SILK MILLS

California, Berkeley. California Silk Mills; $50,000; Frank P. Grinsley, pres.; F. R. Veach, treas., and W. O. Mills, supt. and buyer; Dress Goods, Tie Goods and Fabrics; 200 spindles, 10 looms; sell direct.

Massachusetts, New Bedford. National Spun Silk Co.; $100,000; Marcus Frieder, pres.; G. D. H. Belin, treas.; purchased Oneko plant and are erecting 300 x 50 ft. wing.

New Jersey, Bayonne. Wilpragh Silk Corp.; $500,000; L. Van Praagh, pres.; leased buildings.

Midland Park. Midland Silk Mills, Inc.; $10,000; George H. Schofield, pres.; Bertram Samuels, treas.; James Schofield, supt.; Dress Goods; 22 looms.

Passaic. Passaic Silk Mills; W. B. Lovatt, supt.; Throwing (for own use); 3,000 spindles (Paul Gerli & Co., Inc.).

Paterson. Aleppion Union Silk Co., Inc.; $25,000; Antoine Modallel, pres.; Basher Alyad, treas.; Broad Silks.

Paterson. Harvard Silk Co.; $40,000; Essex Mill; Broad Silks; 10 looms.

Paterson. Holzman Silk Manufacturing Co.; leased space in mill on Van Houten St.; installed broad silk machinery.

Paterson. Hygrade Silk Co.; 64 Ryle St.; $25,000; Broad Silks.

Paterson. Lawrence Silk Mills; leased space in Dunlop Mill; 100 looms.

Paterson. Linwood Silk House; 152 East Railway Ave.; H. Nathanson, prop.; Broad Silks; 30 looms, 30 spindles, 1 winder, 1 warper.

Paterson. Lilienbloom & Parson; 152 Railway St.; Broad Silks; 30 spindles, 11 looms.

Paterson. Melrose Silk Co.; $25,000; Wm. Nussman, pres.; Alex Cohen, treas.; Broad Silks; 20 looms.

Paterson. Migel, J. A.; Broad Silks; 92 looms; electric; H. A. Caesar & Co., selling agents; J. A. Migel, buyer.

Paterson. Peter Morrill, Essex Mill; broad silks; 20 looms.

Paterson. Nipont Silk Co., 48 Warren St.; $25,000; broad silks.

Paterson. Northern Silk Mills; $50,000; William Wishnok, pres.; L. Lippman, treas.; Broad Silks; 72 looms.

Paterson. Occidental Silk Co.; 757 River St.; broad silks.

Paterson. Oliv Silk Mills, Inc.; $20,000; Broad Silks; 32 looms; electric.

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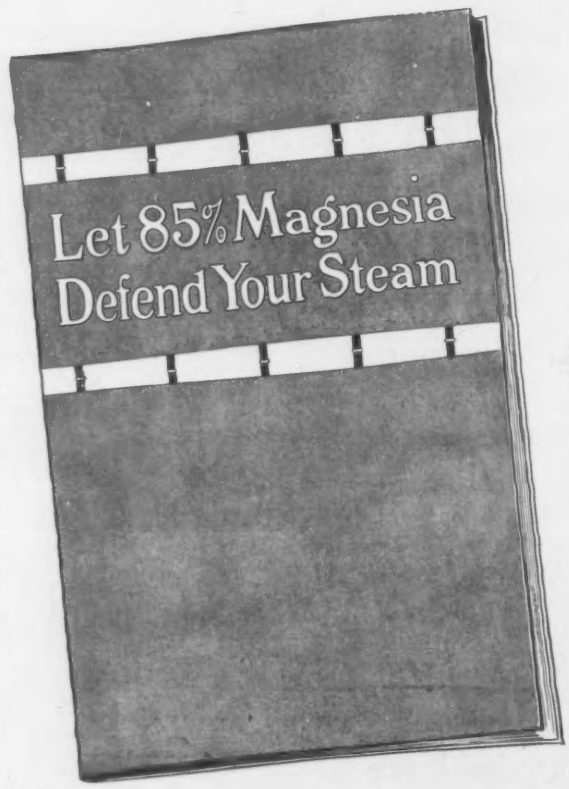

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J. R. Swift, The Franklin Mfg. Co., Franklin, Pa.
R. V. Mattison, Jr., Keasbey & Mattison Co., Ambler, Pa.

Paterson. Paterson Warping & Winding Co.; Dale Mill; 20 broad silk looms.
Paterson. Platt's Universal Silk Mills (Atherton Mill); 351 Tenth Ave.; Plain Broad Silks; 12 looms.
Paterson. Real Silk Fabrics Corp., 44 Front St.; $30,000; silk nets and fabrics.
Paterson. Resnick & Rosenberg Silk Co.; Broad Silks; 8 looms.
Paterson. Rosenblum Silk Co.; $50,000; Broad Silks.
Paterson. Rossie Velvet Co.; annex in Prescott & Waywell Mill.
Paterson. John Ryan, Inc.; $10,000; commission throwing.
Paterson. Silk City Cord & Braid Manufacturing Co.; $50,000; C. Kessler, prop.; Shoe Laces, Cords and Braids.
Paterson. S. Stein; Essex Mill; Broad Silks; 12 looms.
Paterson. Sunlight Silk Co.; $4,500; Samuel Kalish, agent.
Paterson. Veribest Silk Co.; $25,000; Max Rosenstock, pres.; Henry Shain, treas.; Broad Silks; have erected new mill at 170-172 Main St.
Paterson. Wishnack & Jackson; New Dunlop Mill; 40 looms; broad silks.
Phillipsburg. Universal Silk Co., Inc.; $25,000; James E. Gipp, pres.; James E. Gipp, vice-pres.; Thos. R. Connlain, sec.-treas.; Broad Silks; erected new mill; 80 spindles, 10 looms; 15 operatives.
Washington. Washington Silk Mills; 105 looms, 7 warpers; electric power.
West Hoboken. Mistletoe Silk Mill; $100,000; Gustave A. Hurbmann, pres.; Alexander H. Kridel, sec.
New York, Allegheny. Dunlop Silk Co.; branch plant; 16 winders, 100 spindles; winding of thrown silk.
Depew. Andover Silk Co.; new branch; Broad Silk; 6,000 spindles, 120 looms. (Built new mill.)
Dunkirk. Merrill Silk Co.; Fabric Gloves; started new branch in building erected by local investment company for that purpose; 200 sewing machines; erected 40 x 60 ft. addition to plant.
Gloversville. Dennie Silk Mills Co., Inc.; $20,000; Silk, Cotton and Textile Fabrics; 2 looms, 120 spindles, 2 sewing machines.
Gloversville. Politsch & Frye; F. Politsch, supt.; A. Frye, buyer; Silk Jersey for Gloves, Underwear and Hosiery; 120 spindles, 2 180-inch looms; electric; sell jobbers.
Greene. Greene Silk Throwing Co.; A. L. Smith, supt.; silk throwing; 5,000 spindles; built 300 x 54 ft. mill, and will double this in the spring.
Herkimer. Underwood Silk Fabric Co., Inc.; James Underwood, supt.; branch plant; Chamoisette Gloves; piece dye house; electric.
Jamestown. Sakura Silk Co.; $100,000; James McDade, pres.; R. A. Hill, treas.; R. R. Rhines, agent and supt.; Silk Gloves; electric; dye; sell direct. (Branch of Kane.)
Middletown. Middletown Throwing Co., Inc.; throwing.
New York City. Henri Gutmann Silks Corp.; $250,000; Henri Gutmann, pres.; M. W. Reilly, vice-pres.; Samuel Cohn, treas.
New York City. Prosnitz & Co., Inc.; 152 Lexington Ave.; $3,000; Charles Prosnitz, pres.; Jacob Lerner, treas.; Dress and Cloak Trimmings, Silk Cords, Fringes, etc.; 2 hand looms.
Oneonta. Quality Silk Mills Co.; branch plant; Fabric Gloves; 75 machines.
Plattsburg. Clark Textile Co.; branch plant; 200 sewing machines.
Pennsylvania, Allentown. Higrade Silk Co., Inc.; $10,000; John B. Pasquariello, pres. and treas.; Broad Silks; 50 looms; electric.
Avoca. Avoca Silk Throwing Co.; $150,000; Wm. R. Haytock, pres.; H. J. Haytock, treas.; Benj. Haytock, agent.; W. Anderson, supt.; Commission Silk Throwing; 11,000 spindles; electric. (Main office, Easton, Pa.)
Connellsville. Connellsville Silk Co., Inc.; Silk Throwing; (new building erected). Branch of the Specialty Silk Co., Punxsutawney.
Elysburg. The Knepka Silk Throwing Co.; $25,000; C. H. Knepka, pres., buyer and agent; H. C. Kase, treas.; Throwing; 2,800 spindles; steam.
Eynon. Eynon Silks Mill (Universal Ind'l Corpn., New York City); F. Calogero, supt.; Silk Throwing; 7,500 spindles; electric; commission works. (Erected new building.)
Honesdale. Welwood Silks Co. (Hawley); Broad Silks; 250 looms; branch plant established here.
Liverpool. Jouvaud & Lavigne Co. (Danville, Pa.); erecting new mill for making organzine.
Morris Run. Morris Run Silk Co., Inc.; (Branch of Connellsville Specialty Silk Co.); electric; erected new mill.
Nanticoke. Nino Throwing Co.; (Tobyhanna); commission works; branch plant established here.
Nuremberg. Nuremberg Silk Company; $25,000; Arnold Wolfensberger, pres.-treas.; Silk Throwing.
Peckville. Peckville Silk Co.; $25,000; P. D. Snelson, pres.; F. A. Peck, sec.-treas.; Silk Throwing; 3,500 spindles; electric.
Pen Argyl. H. S. Hall; Silk Gloves; electric. (Branch of Jersey City, N. J.)
Philadelphia. Art Silk Co. of America, 1815 Bristol St.; $2,500,000; enlarging experimental plant to make artificial silk from cotton linters.
Philadelphia. Philadelphia Silk Spinning Mills; $100,000; Fred Stringer, pres.-supt.; I. Wasserman, treas.; Tussah Silk; 3,000 spindles; R. J. Steiner, Sr., buyer.
Philadelphia. Schail, Ziegler & Raber; Hope, below S. Berks St.; C. A. Raber, supt.; Narrow Silk Fabrics, Woven Labels and Hat Bands; 7 narrow looms; steam; sell direct; firm, buyers; buy cotton and silk yarns.
Phoenixville. J. H. & C. K. Eagle; leased Emmerich Mill and installed looms. (Branch of Shamokin.)
Scranton. Murray, Russell & Co.; Wm. H. Kilgour, supt.; Silk Throwing; 5,000 spindles.
Souderton. D. G. Dery; N. G. Glattfelter, supt.; Broad Silks; 48 looms; electric. (New branch mill; mail plant at Allentown.)
Wilkes-Barre. Magagna Bros.; Silk Throwing; "Hard Twist" Specialties; 2,500 silk spindles.
Wilkes-Barre. Puritan Silk Corpn.; W. C. Muggil, pres.; E. C. Geier, vice-pres.; H. J. Gigerich, sec.-treas.; Silk and Silk Mixed Broad Silks; 300 looms.
York. Rutland Silk Co.; $25,000; Broad Silks; 50 looms.
Rhode Island, Pawtucket. Pennsylvania Textile Co.; branch mill established in Brown Building, Main and Pine Sts.
Texas, Houston. Texas Textile Company; $250,000; B. N. Garrett, pres. and buyer; J. B. Bageley, vice-pres.; C. A. Lewis, treas.; F. Wide, supt.; Artificial Silk Yarn from cotton; electric.
Houston. Houston Waste & Fibre Mills; $30,000; M. H. Thomas, pres.; F. D. Thomas, treas.; cotton and wool waste. (Leased building.)
Tennessee, Erwin. A. P. Villa & Bros.; branch silk mill; 310 x 55 feet; shipping and engine room 55 x 35 feet; several hundred operatives.
West Virginia, Parkersburg. Kahn & Feldman; $120,000; Silks; silk spinning machinery costing $100,000; new concrete and brick mill 304 x 54 feet, three stories high; cost $50,000.

MISCELLANEOUS NEW MILLS

Connecticut, Mt. Carmel. Mt. Carmel Bleach. & Dye Works; Samuel G. Fitch, pres. and supt.; all sizes Cotton Skeins; steam.
Wauregan. Quinebaug Valley Dyeing Co.; Dyeing and Carbonizing Rags, wool and cotton; John T. Smith, pres.; Benj. Livesley, Jr., treas.
Georgia, Atlanta. Royal Cotton Products Co.; L. G. Neal, pres.; W. B. Reeves, gen. mgr.; Mattress Lint, Pillow Lint, etc.; leased building and installed machinery worth $15,000.
Massachusetts, Grafton. Herbert Taylor & Co.; picking and carding plant.
Lowell. Lowell Top Dye & Print Works; Fred G. Leary, treas.; Thos. Corcoran, supt.; specialize in Worsted Top Dyeing; capacity, 25,000 lbs. weekly; steam and electric; sell direct.
Minnesota, St. Paul. Textile Finishing Co.; Sidney D. Goid and Harry Orinstein, props.; Finishing Buckram, Burlap, etc.; plan to install looms later.
Mississippi, Meridian. Meridian Cellulose Co.; $50,000; Bleached Cotton Linters; T. U. Cole, pres.; Lenox Kahn, vice-pres.; T. R. Cole, secy.-mgr.
New Hampshire, Salem. Haigh & Parmelee; Dyers of Galloons, Ribbons, etc.; built plant and started with two operatives.
New Jersey, Camden. Francis E. Wilson, 1037 No. 25th St.; Converter of Yarns of every description; winder, cones, cops and tubes to skeins, and skeins to cones, cops and tubes.
Newark. Highgrade Belting & Weaving Co.; $175,000; A. G. Fenwich, pres.; F. F. Fenwich, treas.; erect new mill 100 x 200 ft., boiler and engine house 35 x 60 ft.; cost $25,000.
Paterson. Alliance Silk Dyeing & Finishing Co.; $120,000; Claudius Ugnon, pres.; C. DeGrado, treas.; Julien C. Paillard, supt.; Silk Piece Dyeing; steam, water and electric.
Paterson. Gallant & Sullivan Co.; $5,000; Warping and Winding on Commission; 3,500 spindles.
Paterson. Gatti Silk Dyeing Co.; $50,000; V. Sorosso, pres.; John Meola, treas.; Gatti Napoleon, sec.; new mill; 30 operatives; Skein and Piece Dyeing.
Paterson. Globe Dyeing Co.; new mill, 50 x 200 ft.; machinery installed.
Paterson. Grand Warping & Winding Co., 218-220 Main St.; $2,800; Philip Berliner, pres.; Nathan Farber, treas.; erected new mill; 480 spindles; Commission Warping and Winding.
Paterson. M. Lessman; Gun Mill; Warping and Winding; 2 warping, 1 double deck winding frame.
Paterson. Union Piece Dyeing Co.; silk dyeing; $125,000; erected new brick dyehouse; cost $5,500; M. De Grado, prop.
Paterson. Waveriy Warping & Winding Co., 7 Fair St.; $21,000.
Union. Swiss Bleaching & Lace Finishing Co., 508 Humboldt St.; $50,000; Hermann Schleitlin, pres.; Robert Alder, treas.; will bleach Embroideries, dye and finish Laces.
Westfield. United Textile Co.; 10 looms; Asbestos Textiles; (erecting plant).
West New York. Raw Art. Silk Co.; $10,000; Herus Migliora, pres. and supt.; J. M. Flavelle, treas.; winding, coping and quilling natural and artificial silk on commission.
New York, Binghamton. Newton & Kelley; warping and winding on commission; 6 warping, 8 winding frames.
Central Valley. Prescott & Waywell; winding and warping; 12 new copping frames; (new branch of Paterson).
Chappaqua. Gates Paper Twine Co.; $25,000; H. A. Smith, pres.; B. W. Gates, treas. and buyer; Paper Twines exclusively; electric; sell direct. (Office, Pleasantville, N. Y.)
Salamanca. Stewart Dyeing & Bleaching Co.; Frank Carlson, supt.; dyeing of slubbing and yarns; built new mill 30 x 90 ft.
Sloatsburg. Ramapo Finishing Corp.; $250,000; James Bryce, pres.; bleaching, finishing, printing and dyeing of cotton goods.
North Carolina, Burlington. Standard Dye Works, Inc.; $100,000; D. E. Sellars, pres.; W. H. May, treas.; John Keesey, supt. and buyer; Hosiery Dyed and Finished; electric.
Thomasville. Southern Finishing Mills; F. C. Robinson, pres.; W. C. Pennington, treas. and buyer; finishing all kinds of Hosiery; electric; capacity, 3,000 pairs of hose daily.
Ohio, Piqua. Piqua Bleachery Co.; $10,000; G. R. Fairbairn, pres. and supt.; H. E. Sims, treas.; bleaching and dyeing all kinds Yarn, Hosiery and Knit Goods.
Pennsylvania, Allentown. Lehigh Warping & Winding Co.; Commission; 6 warpers, 8 winders. (This company was started as Allentown Winding & Warping Co.)
Rhode Island, Arcadia. Arcadia Print Works; $350,000; Clarence McGuire, pres. and treas.; dyeing, bleaching and printing Cotton Goods; electric.
Pascoag. New England Dyeing & Finishing Co.; $20,000; Joseph J. Luckina, pres.; Gusten A. Nordenstierna, treas.; dye Raw Stock, Yarns and Piece Goods; 40,000 lbs. of tops per week.
Pawtucket. U. S. Glazed Yarn Co.; $31,000; H. S. Rich, pres.; E. E. Aspinwall, treas.; high polished yarns, threads and twines for Hat Bands, Silk Shoe Strings, Trimmings and Underwear.
Providence. Greenville Finishing Co.; $250,000; Alexander F. Shaw, pres.; Frank A. Decker, sec. and treas.; bleach, dye and mercerize fine fabrics.
Providence. Providence Dye Works; dye cotton yarns, specializing in o. d.; Richard H. McLaughlin and Joseph F. McLaughlin, props.; capacity, 10 tons per day.
Providence. Thompson Finishing Co.; $25,000; will finish Braid.
Woonsocket. Florence Dye Works; $20,000; Joseph Cavedon, pres.; Alphonse J. Cavedon, treas.; dye tops, cotton and raw stock; capacity, 35,000 pounds per week; built new mill.
Woonsocket. Star Carbonizing Co.; $10,000; J. Oscar Tessier, pres.; Henry Desroches, treas.; carbonize wool and noils; 20 operatives; leased plant.
South Carolina, Charleston. Charleston Mills; $75,000; J. H. Weil, pres., treas. and buyer; reconditioning of cotton; garnetted stock, etc.; 6 garnetts and 6 pickers; sell direct.
Greenville. Chester M. Goodyear; cleaning and sorting wastes for the trade; 2 cone winders, 1 garnett, 1 picker; electric.

Important Changes

COTTON

Alabama, Talladega. Chinnabee Valley Mills; $200,000; William C. Lanier (Westpoint), pres.; William S. Freeman (Talladega), treas.; John G. Chapman, supt.; Hosiery twist yarns 12s to 16s; 10,500 ring spindles; sell direct and through agents. (Have taken over the Chinnabee Cotton Mills and the Highland City Mills.)
Connecticut, Danbury. C. I. Robinson & Co., formerly commission workers only, installed machinery to triple capacity and manufacture threads and finish yarns for all purposes; 1,116 spindles; electric.
Waterville. H. L. Welch Knit Underwear Co. discontinued operations and sold machinery and plant. Plant will be torn down.
Georgia, Augusta. Crescent Yarn Mills; A. K. Clark, mgr.; 16s to 20s yarns; 4,800 spindles; (Started up Nixon Manufacturing Co. plant; discarded sheeting looms; installed 200 new spindles).
Banning. Hutcheson Manufacturing Co.; controlled by new capital; Justin C. Jackson, pres.; A. L. Jackson, treas.; capital increased to $159,000; 5,200 spindles.
Crawford. Crawford Cotton Mills; J. W. Ingle, pres. and treas.; Ben T. Comer, vice-pres. and gen. mgr. (Took over Edwards Mills, Crawford, and White City Mfg. Co., Athens; erected new weave shed at Athens, 75 by 100 ft.; 110 new looms installed therein.
Dallas. Liberty Cotton Mills; L. R. Adams, pres.; H. L. Turner, sec.; A. W. Stubbs, treas. and mgr.; hosiery yarns; 7,350 spindles. (Succeeds Pauling County Mfg. Co., which was bankrupt.)
Eatonton. Eatonton Cotton Mills; $160,000; Irvin Fitzpatrick, pres.; M. B. Pitts, vice-pres.; W. C. Mason, agent and buyer; two-ply yarns and duck; 6,000 spindles; 150 looms; 20 cards. Haines, Morehouse & Woodford, N. Y., agents; steam and electric. (Took over plant of Putnam Mill & Power Co.)
Griffin. Georgia Cotton Mills; Clyde L. King, pres.; R. B. Shapard, sec.; L. H. Beck, supt.; towels; 4,000 spindles; succeeds Green Cotton Mill; 1,000 spindles added.
Illinois, Chicago. Ajax Quilting & Mfg. Co.; $30,000; Jas. W. Huml, pres.; Jos. Kanta, treas.; cotton felt and quilted goods; succeeds Federal Quilting Co.
Indiana, Madison. The R. Johnson Yarn & Cordage Co.; transferred its business to the Eagle Cotton Mills Co. of same city. Each mill is conducting its business under its own name.
Kentucky, Louisville. Kentucky Cotton Yarn Co. taken over by McCord Co. to manufacture cotton yarns. Plant of the McCord Co. destroyed by fire.
Maine, Castine. Castine Line & Twine Co.; fishing lines; equipment sold to Linen Thread Co. and plant dismantled.
Massachusetts, Clinton. Sterling Textile Mills; $50,000; James Tattersall, pres.; Charles Mayberry, treas.; moved and added 16 looms; succeeds Sterling Mills.
Fall River. Globe Yarn Co., Inc.; $1,000,000; Wm. E. Russell, pres.; Robt. H. Holt, treas. (Took over Globe Mill of New England Cotton Yarn Co.)
Griswoldville. Griswoldville Mfg. Co.; $200,000; Lorenzo Griswold, pres.; Jos. W. Ballard, treas.; cotton goods; formed to combine Griswoldville Mfg. Co. and Turner Falls Cotton Mills.
Methuen. Acadia Mills; $2,000,000; William Whitman, pres.; Ernest Hood, treas.; William A. Pedler, agent and buyer; Combed Cotton Yarn, 1s to 120s; 60,228 ring spindles; electric; dye (yarn); William Whitman Co., Inc., selling agents. (Formerly cotton department of Arlington Mills.)
Millbury. Holbrook Mills Co.; $100,000; Ralph W. Hawkes, pres.; R. F. Rice, treas.; cotton damasks, 85 looms. (Took over business of Edward H. Rice & Co.)
New Bedford. Fairhaven Mills; $3,500,000; Chas. H. Harding, pres.; James Thomson, treas.; Cotton Yarns; 200,000 spindles; Harding, Tilton & Co., selling agents. (Took over Bennett Mill of New England Cotton Yarn Co.)
New Bedford. New England Cotton Yarn Co. sells out all its mills and becomes merely a holding company.
North Oxford. Reid Mills Co.; $20,000; Albert A. Richards, pres.; William C. Reid, treas.; Everett J. Esselstyn, sec.; operating Cutler Mills.
Taunton. Cohannet Co., Inc.; $1,000,000; Wm. E. Russell, pres.; Robt. H. Holt, treas. (Took over Cohannet Mills of New England Cotton Yarn Co.)
Taunton. Nemasket Mill; $100,000; William M. Butler, pres.; James F. Bacon, treas.; cotton yarns. (Took over Cohannet Mill No. 13 of New England Cotton Yarn Co.)
Taunton. Nobska Spinning Co.; $340,000; took over Canoe River Mill of N. E. Cotton Yarn Co.
Westboro. Novelty Weaving Co.; plant sold to Louis Houghton who disposed of machinery.
Mississippi, Natchez. Natchez Mfg. Co.; $150,000; J. W. Sanders, pres.; A. B. Learned, treas.; drills; 22,722 spindles, 636 looms. (Started up one of the Natchez Cotton Mill Co.'s mills.)
New Jersey, Passaic. Algonquin Co.; equipment sold to John J. McCloskey of Philadelphia.
New York, Valatie. Swartmore Textile Co., Inc.; $100,000; S. Schwartz, pres.-treas.; Winthrop H. Moore, vice-pres.; William J. Reinhart, sec.; Webbings and Skirt Beltings; taken over buildings and equipment of the Sartex Co.
North Carolina, Brookford. Brookford Mills Co.; $350,000; H. J. Holbrook, pres.; C. A. Braman, treas.; cotton convertibles. (Succeeds Brookford Mills Mfg. Co.); 21,000 spindles, 600 looms.
Charlotte. Southern Utilization Co.; Wm. G. Beck (Phila.), pres.; W. Horace Linton, vice-pres. and sec.; Ross B. Linton (Phila.), treas. (Took over plant of Charlotte Cotton Fibre Co.)
Cherryville. Cherryville Mfg. Co. re-organized; D. E. Rhyne (Lincolnton), pres.; John J. George, vice-pres.; D. A. Rudisill, treas.
Cherryville. Vivian Cotton Mills; Coarse Yarns; under new management; John J. George now pres. of company; H. D. George, vice-pres.; T. C. Summer, sec. and treas.
Concord. Hartsell Mills Co. New name adopted by the Young Hartsell Mills Co.
Fayetteville. Victory Mfg. Co. (Controlling interests purchased by Robert Lassiter and associates (Charlotte, N. C.). New officers of company: H. W. Lilly, pres.; Robert Lassiter, vice-pres. and treas.; A. E. Ritch, sec.; J. V. Thomasson, supt.
Gastonia. Ozark Mills, new management; Frost Torrence, pres.; S. M. Robinson, treas.; Jno. C. Rankin, vice-pres. and gen'l mgr.
Haw River. Consolidated Mills Co., $500,000; incorporated to take over properties at Haw River, including the Holt-Granite Mills Co.
Haw River. Puritan Mills Co.; incorporated capital, $600,000; to take over properties of Aspen Cotton Mills (Fayetteville, N. C.)
King's Mountain. Incorporated to take over business of the Phenix Mfg. Co.; E. A. Smith, pres.; W. J. Fullerton, vice-pres.; H. C. Dwelle, sec. of the new company.
Patterson. Watts Cotton Mills Co. (J. W. Watts, Stony Point, prop.); Cotton Yarns. (Took over plant of the Patterson Mills.)
Roxboro. The Little River Mfg. Co. name changed to Laura Cotton Mills Co., Inc.; J. A. Long, interested; mill to be enlarged.
Spray. The Carolina Cotton & Woolen Mills Co.; Geo. W. Fraker, pres.; E. D. Pitcher, sec. and treas.; holding company for German-American Mills, Draper, N. C.; Spray Woolen Mills; Nantucket and Lily Mills, Spray, N. C.; New York office, 66 Leonard street.
Stanley. Lloyd Cotton Mill Co.; $60,000; L. Lloyd, pres.; A. E. Wolfe, treas.; J. B. Horton, 20-2 yarns; 2,300 ring spindles; water and steam. (Took over plant of the Mariposa Cotton Mill.)
Winston-Salem. The Inverness Mills; taken over by J. W. Cannon (Concord, N. C.).
Ohio, Toledo. Hettrick Mfg. Co.; Awnings and Ducks; $1,000,000; W. E. Hettrick, pres. and treas. (Succeed Hettrick Bros.)
Pennsylvania, Philadelphia. Copley Textile Mfg. Co., Inc.; 1818 E. Clearfield street; and supt.; Men's wear; 10 broad looms. (New company takes over plant of same name, formerly at 1806 E. Vanango street.)
Philadelphia. Fur Fabrics Mfg. Co.; reorganized with Victor P. Thewlis, pres., and Howard S. Anderson, treas.; 50 wide looms.
Rhode Island. Dimity Quilt Co.; dissolved and plant sold to J. Lister.
Pawtucket. Narotex Co.; $100,000; J. P. Carl Weis, pres.; Clarence A. Steere, treas.; taken over Clarence A. Steere plant; equipment doubled; auto tire fabrics.
Pawtucket. Pawtucket Lace Co.; equipment purchased by F. B. Burns Lace Mfg. Co., Middletown, Conn.

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Pawtucket. Pawtucket Tape Co.; dissolved; taken over by the J. J. Kenyon Mfg. Co.; Robert A. Kenyon, pres. and treas.

Pawtucket. Vienna Braid & Tape Co.; name changed to Windsor Webbing Co.; capital increased to $50,000; J. Henry Thorpe, pres.; H. Ross Matthews, treas.; Edward L. Hotchkiss, supt.

South Carolina, Camden. Wateree Mills; purchased by Lewis Mfg. Co., Walpole, Mass.

Orangeburg. Santee Mills; $225,000; William Elliott, pres.; H. K. Drew, vice-pres.; E. W. Mullins, sec.; F. E. Whitman, treas.; taken over the Orangeburg Mfg. Co.

Union. Monarch Cotton Mills; $3,500,000; a consolidation of the Monarch Cotton Mills and the Lockhart (S. C.) Mills.

Wellford. Fort Prince Spinning Co.; $50,000; Alfred Moore, pres.; H. M. Cleveland, sec.-treas. (Took over plant of Wellford Mfg. Co.)

Tennessee, Shelbyville. Columbia Cotton Mills; J. D. Hutton, pres. and treas. (Incorporated to take over Columbia, Tenn., Cotton Mill Co.).

Texas, Gonzales. The Gonzales Cotton Mill Co.; Ducks, Drills and Brown Sheetings; J. C. Saunders, pres.; W. J. Bright, vice-pres.; Jos. Sheridan, sec. and treas.; J. B. Cleary, supt. (New company formed to operate the Gonzales Cotton Mills.)

WOOLEN

Indiana, South Bend. South Bend Woolen Co.; purchased plants of Columbiaville (Mich.) Woolen Mills; California (Mo.) Woolen Mills; all working on Government woolens.

Maine, Dexter. North Dexter Mfg. Co.; Morris Gledhill, owner; Yarns, Broadcloths. (Took over plant of Maine Steam Woolen Mill.)

Dexter. Wassookeag Woolen Co.; $40,000; Arthur R. Jones, pres.; Albert Gibson, vice-pres.; Chas. R. Gordon, treas.; W. R. Thompson, clerk; all grades of Woolens; 7 sets, 30 looms. (Took over Wassookeag mill and built two-story addition.)

East Wilton. East Wilton Woolen Mills; W. W. Capers, pres.; P. G. Hoyt, treas.; T. G. Hall, supt.; fancy and piece dyed woolens for Men's Wear and Dress Goods; 6 sets; 22 looms; dyehouse; sell direct. (Renovated Walker Mills; no new machinery.)

Worcester. Olney Mills Co.; $150,000; Charles T. McDermott, pres.; Jesse E. McCourt, vice-pres.; Cornelius Brosnan, treas. (Purchased Geo. W. Olney Woolen Co.)

Michigan, Columbiaville. Columbiaville Woolen Co.; $500,000; Edward L. Burch, pres.; H. H. Rich, treas.; F. L. Morginson, supt.; Cassimeres, Woolens, Army and Navy Cloths and Blankets; 3,360 spindles, 7 sets, 49 looms; steam; dye (raw stock); sell direct; E. L. Burch, buyer. (Plant taken over and started up by South Bend Woolen Co. of Indiana, and machine shop added.)

Missouri, California. California Woolen Mills; Army Blankets; 2 sets cards, 14 looms. (Taken over and put in operation by South Bend Woolen Co. of Indiana.)

New Hampshire, Gilsum. Ashuelot Woolen Co., Inc.; reorganized and incorporated for $30,000; Arthur R. Jones, pres.; Stone & Starkey, selling agents.

Penacook. Penacook Co.; $100,000; George Schofield, agent. (Will take over plant of Brampton Woolen Co. in February.)

Rochester. Rochester Woolen Co.; $400,000. Eli Gledhill, pres.; Thomas E. Eaton, treas.; Government work at present; 13 sets cards, 52 looms. (Took over plant of Rochester Woolen Mills.)

Wilton. Souhegan Woolen Co.; Frank L. Davis, pres.; John E. Gray, treas.; Suitings, Cloakings and Overcoatings; 8 sets, 140 looms. (Took over plant of C. J. Amidon & Son.)

Wolfeboro. Racine Woolen Mills; purchase Springfield Woolen Mills and put them in operation; C. M. Elliott, mgr.

New Jersey, Camden. Salisbury Worsted Mills purchased and operated by Cleveland (O.) Worsted Mill Co.; worsted yarns for weaving and knitting.

New York, Fulton. Woolen & Worsted Mills, Inc.; $100,000. (Reorganization of Fulton Worsted Mills; Woolen and Worsted Goods.)

Otto. Ellicott Spinning Co.; taken over Otto Woolen Co.; $20,000; T. J. Brisbane, pres.; M. Murphy, treas.; J. J. Casey, supt.; Knitting Yarns; 3 sets of cards, 900 spindles.

Seneca Falls. Geb & Garvan Yarn Co.; Thos. F. Garvan and George F. Geb, props.; weaving and knitting yarns in all sizes; 9 sets cards, 2,180 mule spindles, 800 twister spindles; moved machinery from Central Village, Conn., to plant of Seneca Woolen Co., and installed 10 new spinning frames.

North Carolina, Maiden. Carolina Cotton Mills; $100,000; absorbed plant of Catawba Woolen Mills; make woolen yarns in addition to cotton.

Ohio, Dresden. Dresden Woolen Mills Co.; $25,000; Wm. E. Patterson, pres. and treas.; John H. Miller, supt.; Ladies' Flannels and Skirts; 3 sets, 10 looms; gas and steam; dye; sells direct; John H. Miller, buyer. (Purchased plant of Shore Bros.)

Oregon, Bandon. Sunset Woolen Co.; Geo. P. Laird, pres.; W. S. Wells, vice-pres.; E. H. Boyle, treas.; J. D. Ladley, mgr., buyer and supt.; Blankets, Flannels, Mackinaws; 3 sets cards, 1,200 mule spindles, 20 looms; steam; dye; T. A. Shaw & Co. (Chicago), selling agents. (New company operating the old Bandon Woolen Mills.)

Pennsylvania, Bloomsburg. Riverdale Worsted Mills; Worsted and Artificial Silk Yarns; plant at Espy destroyed by fire; to start new plant at this place.

Philadelphia. The Elton Textile Mills, Main and Carson Sts.; Dress Goods and Men's Wear. New name taken by D. W. C. Ellis & Co., Inc.

Philadelphia. Franklin Textile Mfg. Co., Frankford; partnership dissolved; business continued under old name by John Fulton and John J. Beattie.

Philadelphia. Joseph D. Murphy, 30th and Reeds Sts.; Cotton, Woolen and Worsted Goods; operates plant formerly run by Murphy & Bros., partnership dissolved; erected new addition, 30 x 95 feet, one story, brick.

Philadelphia. Randall, Joseph W., & Bro., Inc.; Franklin Yarn Mills; 103 East Sharpnack St.; $75,000; Thomas Randall, pres.; J. W. Randall, sec., treas. and mgr.; Jos. Barnett, supt.; Woolen and Merino Yarns (Belgian system), also Colored Yarns and Mixes, 6 to 50 cut; 3,040 spindles; 5 sets; steam; sell direct; J. W. Randall, buyer. (Formerly operated on commission.)

Somerset. Barkley Woolen & Hosiery Mills; Luella Parkhill, pres.; Lemuel R. Barkley, agent and supt.; blankets, flannels, carpets, rugs, hosiery, etc. (Took over Cook Woolen Mill and added 2 knitters, 6 looms, and 360 spindles.)

Rhode Island, Greenville. Namquit Worsted Co. purchased Continental Worsted Mills and moved plant from Bristol, R. I.

Pascoag. Roscoe Worsted Mill, Inc.; $100,000; Robert Schwartz, pres.; Paul Schwartz, treas. (Took over Akela Mill.)

Providence. Monohasset Mills; taken over by the Cleveland (O.) Worsted Mills Co.; operated as spinning and weaving mill; additions and alterations.

Tennessee, Harriman. Harriman Riverside Woolen Mills; purchased by S. D. Covert; equipment of Cumberland Gap (Tenn.) Mills and Pine Bluff (Va.) Mills controlled by Mr. Covert to be removed to Harriman, new machinery to be added, including 40 broad looms.

Vermont, Ludlow. Black River Woolen Co.; buyer; Cloth and Bathing Suits; sell direct; 5 new knitting machines. (Took over plant of the Wolverine Knitting Co.)

Kentucky, Somerset. Beattie Hosiery Mills, Philadelphia, reported moved to Somerset, where it has purchased the Swannannoa Hosiery Mills.

Louisiana, New Orleans. O. K. Knitting Mills; bankrupt and mills sold.

Maine, Norway. Oxford Knitting Co.; $10,000; T. C. Hunton and Henry B. Foster, incorporators. (Reorganization of Norway Knitting Co.)

Massachusetts, Boston. Matison Knitting Mills; $15,000; Saul Matison, pres.; Max Cohen, treas. (Took over business of Matison Knitting Co.)

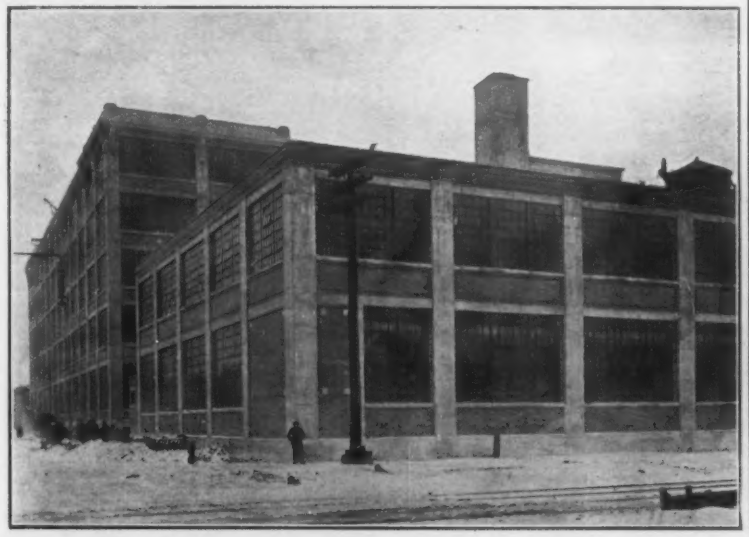
East Douglas. Tally-Ho Knitting Co.; bankrupt and stock sold at public auction.

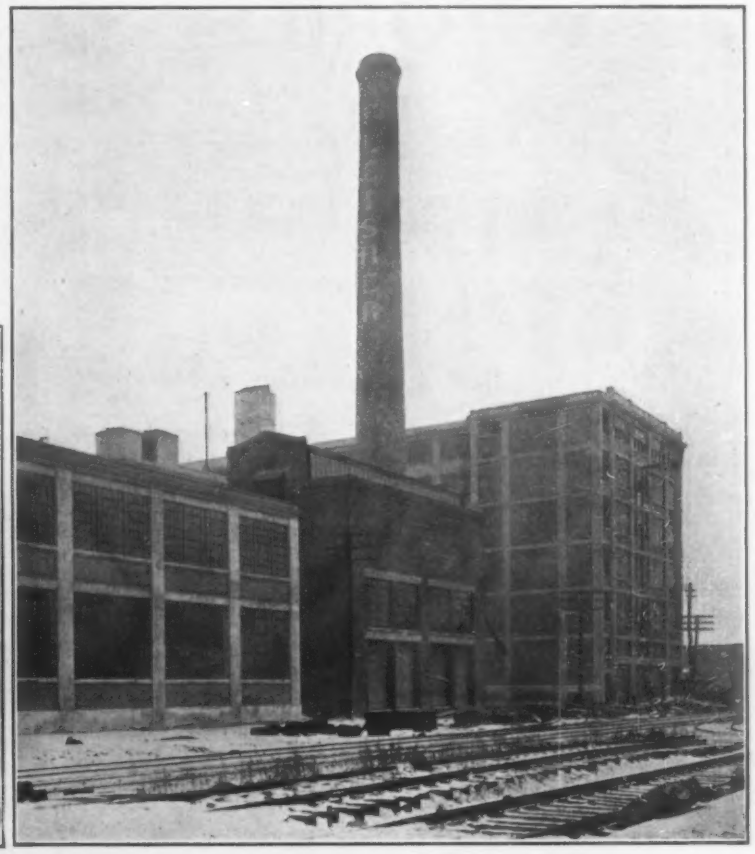
Ipswich. Essex Hosiery Co.; plant sold at auction.

West Roxbury. Name of Oakes Knitting Mills Co. changed to Armstrong Knitting Mills.

New Jersey, Morristown. Elfo Hosiery Co.; $1,000; Jack Dryfoos, pres.; Sydney Dryfoos, treas.; 30 knitting machines; goods for government. (Took over plant of Common-Sense Hosiery Co.)

New York, Binghamton. Patchogue Knitting Mill; changed name to Binghamton





FRONTAGE ON 25TH STREET OF NEW PLANT OF S. B. & B. W. FLEISHER, PHILADELPHIA

Old Town. Guilford Woolen Co.; $200,000; M. S. Holway, pres.; Herbert Gray, treas.; Cassimeres and Cloakings; 6 sets cards, 36 looms; W. S. Duval & Co., New York, selling agents. (Succeeds M. L. Hussey Woolen Co.) Installed 2,320 spindles.

Sangerville. Glencoe Woolen Mills, Inc.; $400,000; Eli Gledhill, pres.; L. J. Coburn, vice-president; F. H. Carr, secy.; Thos. E. Eaton, treas.; Men's Wear and Overcoatings. (Succeeds Glencoe Woolen Co.)

Skowhegan. Daniel E. Cummings; Custom Picking and Shoddy; 2 pickers. (Moved branch from Madison, Me., to leased building here.)

Massachusetts, Dodge. Pike Woolen Mills; Chauncy Pike, prop.; Everett E. Pike, supt., mgr. and buyer; 3 sets cards; 36 narrow looms; steam and water. (Formerly C. W. Pike Mill.)

East Brookfield. Daniels Mfg. Co.; Woolens and Worsteds; took over Quaboag Mfg. Co. plant and does spinning and carding only, weaving being done at main plant, Rockville, Conn.; 6 sets cards, 28 looms; planinng to move entire plant here.

Fitchburg. Aetna Mills (Watertown) acquired capital stock of Shirreffs Worsted Co.

Franklin. Clover Worsted Mills; $125,000; Herbert Lawton, pres.; James D. Giunta, vice-pres.; Margaret Smith, treas.; Worsted Men's Wear; 55 looms. (Took over Singleton Worsted Co.)

Lowell. Merrimack Woolen Corp.; $400,000; Dress Goods; took over Merrimack Woolen Co.; Edwin G. Morrison, pres.

Wales. Lexington Mills, Inc.; $60,000; Rich-Burton, treas.; Army Blankets; 5 cards, 20 looms. (Took over Shaw Mills.)

reorganized; capital stock increased to $120,000; Geo. W. Raymond, pres.; Frank L. Bugbee, treas.; A. W. Blocumn, supt.

Virginia, Bonsack. Bonsack Bros.' plant now operated as Bonsack Woolen Mill; dyehouse erected; added 3 sets of cards, three 330-spindle mules, 10 looms, with finishing equipment.

Winchester. Winchester Woolen Mills; $50,000; George Dunham, pres.; C. D. Grimm, sec.; Shirley Carter, treas.; taken over Winchester Woolen Mills; capacity of plant to be trebled.

Washington, Spokane. Inland Woolen Mills; $50,000; W. L. Crowe, pres.; W. W. Downard, treas.; J. F. Brallier, supt.; Blankets and Mackinaws; 2 sets; 13 looms; steam and electric; sell direct. Buy cotton warp, 10-12 single. (Operate the old Spokane Woolen Mills.)

West Virginia. Phillippi Blanket Mills; $75,000; Edward C. Hall, pres.; Philip D. Campbell, vice-pres.; C. L. Hall, sec. and treas.; blankets and other woolen goods; 2 sets 60 inch cards; 22 broad looms. (Took over Phillippi Woolen Mills Co.)

Wisconsin, Merrill. Merrill Woolen Mill Co., Stickler & Anderson, props.; formerly L. H. Stickler & Sons; added 1 set cards; added manufacture Socks and Mackinaw Cloth.

Canada, Ontario., Listowel. P-K Worsted Spinning Mills, Ltd.; (taken over worsted spinning department of Perfect-Knit Mills, Ltd.); all kinds of Mixes and Floss Yarns; new brick mill, 150 by 78 feet; 1,000 spinning and 500 twisting spindles from Perfect-Knit Mills installed; Walter Greenwood, supt.

KNITTING

Illinois, Chicago. Pelton & Pelton; 306 Franklin St.; Louis Pelton, pres. and Knitting Mill; leased mill at 119 Chenango St.

Brooklyn. Eskimo Knitting Mills; purchased by Messrs. Weitzer and Linitz; leased two additional floors in mill; new machinery.

Brooklyn. Ober Manufacturing Co.; $6,000; A. Oberstebrink, pres.; Maxwell Grierson, treas.; taken over business of the Bedford Knitting Mills; Neckwear, Mufflers and Jersey Cloth; 11 knitting machines, 1 sewing machine.

Buffalo. Bison Knitting Mills Co.; taken over by Monarch Knitting Mills to protect trade-mark; inactive.

Cohoes. Troy Knitting Co.'s machinery disposed of and plant sold to real estate men.

Greenwich. Jesse V. Palmer Co.; Ribbed Underwear; dissolved; plant leased and part of machinery purchased by George W. Clark.

Little Falls. Phoenix Underwear Co.; discontinued manufacturing Underwear and make only Sweaters and Yarns; cutting and finishing departments shut down.

Lynbrook. Atlantic Knitting Mills; Fiber Silk and Worsted Scarfs, Caps, etc. (Purchased building and moved plant from New York.)

New York City. Dorfman Bros.; dissolved partnership; Meyer Dorfman continuing business; Knitted Neckwear, Sweaters and Fancy Knit Goods.

New York. North Pole Knitting Works; Bertha Rembaugh appointed receiver; sold.

Oswego. Chonagen Textile Mills changed name to Conway Knitting Mills; $40,000; Daniel H. Conway, pres.; Thomas H. King, sec.-treas.

Sherburne. Sherburne Knitting Corp.; $250,000; Rodney Jones, pres.; John P. Liddy,

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treas.; controlled by officials of the Augusta Knitting Co., which has leased plants and equipment of the Canasawacta Knitting Co. at Sherburne and Bath, N. Y.

North Carolina, Burlington. Southern Hosiery Mills; new management; J. M. Browning now pres.; H. M. Montgomery, vice-pres.; C. J. Boland, sec.-treas. (New building erected and plant removed to same.)

Charlotte. The Defiance Sock Mills, Inc.; $100,000; (took over plant of the Defiance Sock Mills); increased equipment to 31 knitters, 21 loopers and 6 sewing machines; J. E. Wilkinson, supt.

Connelly Springs. Klison Hosiery Mills; Ladies' Hosiery. Controlling interest in plant purchased by William G. Broadfoot, of Dicks, David & Broadfoot (New York City.) To be enlarged.

East Durham. Banner Hosiery Mills Co.; $10,000; C. J. Thompson, pres.; J. H. Emory, treas., supt. and buyer; Men's Seamless 184 and 200 Needle Half Hose; consolidated with Youngsville (N. C.) Hosiery Mills, known as Banner Mills.

East Durham. Crystal Hosiery Mill; C. L. Higbee, mgr.; Men's Half-Hose; 36 knitters and 4 loopers. (Succeeds E. H. Emory Co., which has dissolved.)

Gibsonville. Gibsonville Hosiery Mills Co.; reorganized with capital stock of $14,300; J. W. Burke, pres.; A. B. Owen, sec.-treas. and buyer; W. M. Jones, supt. Make 168 and 200 needle Women's Hose and men's Half Hose.

Hildebran, N. A. Cline & Son; Women's Hosiery; took over Waldensian Hosiery Mills No. 2.

Icard. Highway Knitting Mills; W. Y. Frazier purchased interest of D. B. Mulls and is now sole prop. of plant.

Spindale. Parsley & Tanner, Inc.; new building erected; office moved from Forest City; Spindale plant operated on Ladies' 220 Needle Lisle and Mercerized Hose; Forest City mill (No. 1); Men's Carded Half Hose. (Took over firm of Wilkie & Tanner, Inc.) Added 69 new knitting machines.

Wilson. Wilson Knitting Mills, formerly Runnymede Mills No. 3, Inc.; capital stock increased from $27,000 to $150,000; A. McDowell (Scotland Neck), pres.; C. W. Jeffreys, treas. and agt.; P. B. Walker, supt. Added 31 knitting machines. (This plant is independent of the one at Tarboro.)

Ohio, Bowling Green. Monarch Underwear Co. purchased by Piqua Hosiery Co.; equipment to be increased.

Pennsylvania, Adamstown. Central Hosiery Co.; $20,000; Homer L. Stork, pres.-supt.; Cotton Half Hose. (Took over plant of Harry Fisher.)

Allentown. Allentown Knitting Mills; Ladies' and Children's Underwear. Took over Allentown Knitting Co., added mfg. merc. stripe Vests and Vests wholly of merc. yarn; also Children's Knit Waists.

Bally. Frank Y. Kitzmiller (Reading). Purchased Bally Hosiery Mill. To increase capacity.

Bechtelsville. Bechtelsville Hosiery Mill; $50,000; F. W. Kitzmiller, pres. and buyer; B. Kutz, supt.; Women's Seamless Hosiery. (Rebuilt plant destroyed by fire of Kutz Knitting Mill, resumed operations under new name.)

Bridgeport. Bridgeport Knitting Mills; Hosiery; taken over by Rambo & Regar, Inc., and operated as branch of plant at Norristown.

Germantown. Ansty Knitting Mills; Ladies' Cardigan Jackets and Fancy Knit Goods; C. E. McElwee purchased J. Springthorpe's (deceased) interest in plant.

Hatfield. Taubel Bros. (Philadelphia); Hosiery; purchased plant of Knipe Knit Goods Co.; operate as branch plant.

Hawley. Carbondale Knitting Co. (Carbondale); leased the Bower Knitting Co.'s plant for several years and will operate same as a branch mill.

Hawley. Supreme Knitting Co. (104 E. 25th St., New York); taken over plant of the Saxony Knitting Mills; new machinery added, increasing capacity of old plant.

Lititz. Lititz Knitting Co., Inc.; $10,000; took over plant of Lititz Springs Hosiery Mill.)

Oley. Gilt Edge Hosiery Mills; $10,000; Hosiery, Underwear, etc.; took over plant of the Oley Knitting Mills).

Philadelphia. Allen Hosiery Co. (Germantown); capital stock $100,000; Benj. Allen, 3d, pres.; G. Allen Smith, sec.-treas.; Wm. C. Ackerman, vice-pres. and gen. mgr.; company incorporated; took over Allen Hosiery Co.

Philadelphia. Cadet Hosiery Co.; $250,000; W. M. Pepper, pres.; C. W. Linscott, treas.; H. M. George, vice-pres. and gen. mgr.; new company formed took over plant of Oneida Knitting Co. at this place; also mills at Oneida, N. Y.

Philadelphia. Largman Bros.; 10th and Berks Sts.; Sweaters. Partnership (Harry Josephs and Jacob Largman) dissolved; business continued under same name by Harry and Joseph Largman.

Philadelphia. Notasema Hosiery Co.; Oxford and Mascher Sts.; company reorganized; Maurice T. Fleisher, pres.; Lester Wolf, vice-pres.; Eugene Wolf, treas.; Horace T. Fleisher, sec.

Philadelphia. Novelty Knitting Mill; Edward Axford, 363 Price St., Germantown; Women's and Children's ribbed underwear. Operating plant formerly run by John Axford.

Philadelphia. Oriental Knitting Mills; Wm. Stenger, prop.; 5629-31 Tulip St.; Wissinoming; Silk and Worsted Coats and Scarfs; 3 flat knitting machines; 4 round frames; 5 sweater machines; 12 sewing machines; finish; electric; sell direct; buy woolen, worsted, silk and art silk yarns. (Took over plant of the Heather Knitting Mills.)

Philadelphia. Pennsylvania Knitting Mills; 16th & Callowhill Sts.; absorbed plant of the Coast Knitting Co. (Woodbine, N. J.), consisting of 70 knitting and 25 sewing machines.

Pottsville. Stein and Miller; Women's Cotton Ribbed Underwear; leased West End Knitting Mill and operate in connection with their plant; giving total 31 and 23 sewing machines.

Reading. Glenside Knitting Mills; George O. Runyeon, owner; half hose, 100 knitting machines. (Discontinued mill at Jonestown, and built new mill here.)

Reading. E. Richard Meinig Co.; Silk Gloves and Ladies' Silk Underwear; reorganized; E. Richard Meinig, pres., treas. and gen'l mgr.; John Vogt, asst. treas., and sec.; F. E. Turner & Son, New York City, selling agents.

Roxborough. Arlington Knitting Mills, Inc.; Takes over Arlington Knitting Mills operating plant on sweaters.

Slaterdale. Slaterdale Knitting Mills; Incorporated capital stock, $10,000; take over Slaterdale Knitting Mills; W. G. Starry, gen'l mgr.; Men's and Children's Hosiery. Additional machinery installed.

Womelsdorf. Staumbach and Hix purchased plant of W. I. Dundore (Seamless Half Hose). Will continue operations.

South Carolina, Westminster. Westminster Knitting Mills; new company organized to take over plant; J. S. Carter, pres.; J. Carter, treas.; Arthur P. Brown, sec.; no new machinery to be added.

Tennessee, Alton Park. Tennessee Textile Mills; $100,000; taken over Cedar Product Co.'s plant; Women's and Children's Hosiery; 100 knitting machines, etc., costing $30,000.

Maryville. Ideal Hosiery Mills; $50,000; S. W. Duggan, pres.; James L. Getaz, treas.; men's half hose; 100 knitting machines. (Took over Maryville Hosiery Mills.)

Virginia, Williamsburg. Williamsburg Knitting Mills Co.; dissolved; plant sold at auction; machinery removed.

Wisconsin, Green Bay. Green Bay Knitting Works; $25,000; E. J. Balza, pres.; Frank Bender, treas.; H. F. Bach, mgr. and buyer; Sweater Coats, Fancy Knit Goods, etc.; 15 Knitting machines; 13 sewing machines; electric; sell retailers; buy 2-16 worsted. 2-20 wool. (Formerly Inland Knitting Works.)

SILK

Connecticut, Watertown. H. K. H. Silk Co., $2,500,000; take over and operate plants of Hammond, Knowlton & Co.; M. Heminway & Sons Co.; Eureka Silk Mfg. Co.; Incorporated New London Wash Silk Co.; C. C. Knowlton, pres.; George A. Driggs, first vice-president; Theodore B. Thompson, treasurer; Frederick W. Shaw, sec.

Willimantic. A. G. Turner Co.; silk throwing; equipment sold to J. A. Bonneville of Canada, who has removed half to his own plant and is disposing of balance.

Winsted. Winsted Silk Co.; reorganized with M. M. Belding, pres.; F. N. Belding, treas., and A. E. Palmer, agent and buyer. Capital stock, $145,000.

New Jersey, Paterson. M. Finkelstein & Sons, Inc.; $100,000; consolidates Arrow Silk Co., and M. Finkelstein; 100 looms operated.

Paterson. Good Throwing Co.; purchased by the Weston E. Good Co., Inc.; capital increased from $25,000 to $100,000.

Paterson. Koransky Bros.; name changed to Prince Silk Co.

Paterson. I. Kravitz; 204 Van Houten St.; 460 spindles, 64 looms. (Formerly Irving Silk Co.)

Paterson. H. R. Mallinson & Co., New York City; commission throwsters; 5,000 spindles. (Purchased plant of Charles E. Frost Co.)

Paterson. Modern Central Silk Dyeing and Finishing Co.; combination of the Modern Silk Finishing Co., New York City, and the Central Silk Finishing Co., Paterson; operate 2 plants.

Paterson. J. C. Naegli will operate the 100 looms installed in plant of Favorite Silk Co., which was dissolved in July.

Paterson. Saratoga Silk Co.; changed name to Republic Silk Co.; $25,000; moved to Van Kirk Mill; 60 looms; Republic Silk Co. sold plant to Reliable Silk Co.

Paterson. Stanford Silk Co., Inc.; $25,000; H. B. Stanford, pres. and treas.; Jas. Martin, supt.; Broad Silks; 38 looms; H. B. Stanford & Co., selling agents. (Reincorporation of Stanford Silk Co. of Paterson.)

Paterson. Straus & Silber, Inc.; $12,000; Leo G. Straus, pres.; Meyer K. Silber, treas.; broad silks; 400 spindles; 70 looms. (Formerly Silber Silk Co.)

Paterson. Yokohama Silk Co., 27 Kentucky Ave.; $25,000. (Succeeds Rose Silk Co.)

Pompton Lakes. Artistic Weaving Co. changed name from German Artistic Weaving Co.; capital stock increased to $1,000,000.

West Hoboken. Forsthoff Weaving Co.; $20,000; E. Ernst Forsthoff, pres.-treas.-supt.; Narrow Ribbons, etc.; 11 looms; electric. (Incorporation of Forsthoff-Dressler Weaving Co.)

West New York. D. G. Dery purchased controlling interest in West New York Silk Mills; Dress Silks.

New York, Bath. Hartley Silk Manufacturing Co.; unable to operate plant owing to scarcity of labor; equipment being removed.

Carthage. Jefferson Silk Co., Inc.; $20,000; Ludwig Littauer, pres.; H. A. Schmidt, treas.; Siegfried Littauer, sec.; Thrown Silks; 9,000 spindles. (Took over Carthage Silk Mills, Inc.)

College Point. Myhnepo Ribbon Mills; filed certificate of voluntary dissolution.

Cortland. Cortland Gouverneur Silk Mills, Inc.; $112,500; merger of the Cortland (N. Y.) Silk Co. and Gouverneur (N. Y.) Silk Mills; Frank E. Terry, pres.; L. Thornley Jones, treas.; James A. Moss, supt.; addition 24 x 56 ft.; 20 additional looms.

Dunkirk. E. Van Raalte purchased Niagara Silk Mills at Buffalo, North Tonawanda, Dunkirk and Meadville, Pa.; Gloves; J. E. Elwell, gen. mgr.; Lewis Dunham, supt.; machinery to be added.

New York. Kessler & Groman; dissolved partnership; business continued by S. Kessler.

Pennsylvania, Mt. Carmel. Shindel-Wert & Co., Inc.; Broad Silks; taken over plant of Mt. Carmel Silk Mfg. Co.

Philadelphia. Quaker Braid Co.; 1011 Diamond St.; Jos. A. Hermes, pres.; Geo. J. Justus, vice-pres.; W. S. Enochs, treas.; Dress Trimmings and Braids, principally for millinery. (Consolidation of Enochs-Hermes Braid Co. and Geo. S. Justus & Co.)

Scranton. Industrial Silk Throwing Co.; Commission Throwing; Georgette and Crepe only (was formerly known as Tripp Park Mill).

Scranton. Pennsylvania Silk Throwing Co.; Throwing; purchased plant of W. A. Lush Silk Co. and operate it as Mill No. 2; 10,000 spindles; to be increased to 15,000 in April.

Stroudsburg. Stanford Silk Co., Inc., of Paterson took over Lippman Silk Manufacturing Co.

Weissport. Franklin Silk Co.; Silk Throwing; operating plant of the Everett Silk Co.

York. D. G. Dery; purchased York and Monarch Mills of the Pennsylvania Textile Co.; giving about 1,000 more looms.

Rhode Island, Pawtucket. Pennsylvania Textile Co.; Broad Silks; purchased Abedare Weaving Co. plant and added 100 looms. (Branch of York, Pa.)

MISCELLANEOUS

Massachusetts, Brockton. Walker Webbing Co.; $10,000; Dress Belting and Tapes; took over Star Webbing Works, Inc.; J. Townsend Walker, pres.-treas.

Great Barrington. Great Barrington Mfg. Co.; $75,000; Albert S. Pratt, pres.; F. L. Bottom, treas.; Cotton Goods, Bleaching and Finishing; succeeds Barrington Mills; erected 23 x 36 ft. addition, two stories.

Wilkinsonville. Anco Dyeing & Finishing Co.; $350,000; John H. Meyer, pres.-treas.; dyeing and finishing of cotton goods; reorganization of Anco Mills, manufacturers of duck.

New Jersey, Passaic. M. DeSaye & Co. changed name to Passaic Bleachers & Dyers Association.

Passaic. Century Dye & Print Works, Inc., bankrupt.

Paterson. Lincoln Silk Finishing Co.; Van Houten St.; $10,000; A. Nazzaro, pres.; P. J. Rappoport, treas.; G. A. Groeger, Jr., supt.; Piece Dyeing and Finishing; finishers all yarn dyed goods. (Formerly Manhattan Finishing Co.)

Paterson. National Silk Dyeing Co.; added 25,000 square feet floor space; purchased American Silk Finishing Co.

Paterson. Paterson Silk Dyeing Co.; will take over plant of Independent Silk Dyeing Co.; John Goode, promoter.

Paterson. J. M. Woodward, formerly at Carlstadt, N. J.; commission winding of all descriptions; 1,200 silk spindles and 12 warping frames; electric.

Paterson. Washbauer & Breitenstein Finishing Co.; $50,000; finish, dye and print silks. (Succeeds Isadore Washbauer.)

Union. Royal-Hasco, Inc.; $1,000,000; William L. Wirbelauer, pres.; Ferdinand Klump, treas.; taken over plants of Royal Piece Dyeing Co., Paterson, and the Hasco Dyeing Co., Union Hill and Weehawken; Dyeing, Finishing, Printing, Quilling and Winding.

Oregon, Portland. The Pacific Coast Linen Mills, Inc.; $250,000; J. Sidney Starling, pres. and gen. mgr.; Linen Yarns, Crash Toweling, Canvas, Duck, etc.; 2,000 flax spindles, 80 looms; sell direct; use steam, water and electric power; J. Sidney Starling, buyer. (Took over old plant of Multnomah Hair Mills and added 25 new looms.)

Pennsylvania, Hamburg. Gotham Underwear & Bleach Works; name changed to S. D. Bausher's Bleach Works; increased from 10,000 to 18,000 lbs. capacity daily; knitting machinery of this plant removed to Glorie Underwear Mill (Reading).

Philadelphia. Chas. Devlin & Sons, Inc., have been incorporated with capital stock of $100,000; Chas. Devlin, pres. and supt.; for Cotton and Woolen Waste. (Succeeds Chas. Devlin, Inc.)

Philadelphia. Hollingwood Dye Works; F. H. Birkby, mgr.; succeeds Fern Rock Dye & Finishing Works.

Philadelphia. Hulton Printing, Processing & Dyeing Co.; Frankford Ave.; taken over dye plant of the Kensington Winding & Processing Co., dissolved, and now dye fast colors on yarns in addition to former work.

Philadelphia. Philadelphia Axminster Carpet Co.; 2115 Huntingdon St.; Arthur Fowell, supt.; Dye Woolen Yarns; R. E. Vickerman, buyer. (Took over plant of the Federal Dyeing Co.)

Philadelphia. Royal Silk Dyeing Co., Inc.; 2616 N. Martha St.; $10,000; W. R. Russell, pres.; Myer Coura, sec.; S. Posner, treas.; Skein Silk, Dyers, and Dyers of Silk and Cotton Hosiery; (capacity 1,500 lbs. per day); W. R. Russell, buyer. (Took over plant formerly operated by W. R. Russell.)

Rhode Island, Thornton. Morgan Mill; sold Processing Wool, Noils and Waste, Garto L. W. Peckham Co.; S. A. Carroll, mgr.; ing Co.; taken over Fairmount Dye & netting, Scouring, Burring, etc.

Woonsocket. Woonsocket Dyeing & Bleach-Print Works; to be operated as Dye Works No. 2.

Enlargements and Improvements

COTTON

Alabama, Alabama City. Dwight Mfg. Co.; erected new 3-story building, 180 x 80 ft.; equipped with opening and picking machinery; about $50,000 expended.

Anniston. The American Net & Twine Co.; new $200,000 mill built, 162 x 114 ft., 3 stories; fireproof; equipped with 5,000 spindles.

Birmingham. Avondale Mills; erected an addition to cloth room and to slasher and picker rooms.

Fairfax. The Fairfax Mill; built new 3-story bleachery and a new cloth room; complete machinery equipment installed; also added 5,500 spindles and 220 looms.

Lanett. Lanett Cotton Mills; to erect new weave shed 550 x 260 feet, one story; added 13,000 new spindles and 500 looms.

Mobile. The Barker Cotton Mills; built addition 186 x 50 ft., with wing 46 x 46 ft.; machinery for dyeing and bleaching installed.

Mobile. The Pope Mfg. Co.; increased capital stock from $50,000 to $62,500.

Roanoke. The W. A. Handley Mfg. Co.; new weave shed erected, 224 x 96 ft.; added 62 new looms, 6,000 spindles and 4 twisters.

Selma. The Selma Mfg. Co.; installed 2,000 spindles for manufacturing twine and yarn, in addition to osnaburgs.

Sylacauga. Eva Jane Mills; installed 72 new 60-inch looms.

Sylacauga. Marble City Mills; new mill built replacing plant destroyed by cyclone; capacity of 10,000 spindles. Installed 5,100 spindles.

Arkansas, Helena. The St. Francis Cotton Mills restarted; 5,000 spindles added to the equipment.

California, Oakland. California Cotton Mills; addition completed; new machinery to consist of about 150 looms and 8,000 spindles; new building to cost about $500,000.

Connecticut, Central Village. Central Worsted Co.; installed 10 direct drive looms.

East Hampton. Summit Thread Co.; addition 100 x 40 ft., three stories, brick; new machinery includes dressers, spoolers and winding machines.

East Norwalk. American La Dentelle, Inc.; Cluny and Torchon Laces; erected new mill and moved plant from Brooklyn; 5,000 spindles added.

Middletown. Russell Mfg. Co.; Cotton Webbing; new brick dyehouse, 34 x 80 ft., two stories high, plastic slate roof; also purchased Woodhouse buildings.

Georgia, Ackworth. Ackworth Cotton Mfg. Co.; Hosiery Yarns; 700 new spindles installed.

Athens. Southern Mfg. Co. increases capital from $500,000 to $1,000,000.

Augusta. Sibley Mfg. Co.; Drills, Sheetings, etc.; 280 looms installed to replace old machines.

Augusta. Southern Press Cloth Co.; built 300 x 50 ft. two-story mill and boiler house costing $20,000; new weaving and spinning machinery installed.

Dalton. Crown Cotton Mills; Ducks and Osnaburgs; installed 154 new broad looms.

Jefferson. Jefferson Mills; Drills, Twills, Duck; new weave shed erected; 5,000 ring spindles and 256 new looms added. (Part of looms to replace old machines.)

Lafayette. The Lafayette Cotton Mills; 2,240 ring spindles and 40 looms added.

La Grange. Dixie Cotton Mills; Ducks; built 60 x 75 ft. addition to beaming room; no new machinery.

Lavonia. Lavonia Cotton Mfg. Co.; erected addition for installation of 120 looms for manufacture of Ducks, in addition to former product of yarns.

Lawrenceville. Lawrenceville Yarn Mills; Cotton Yarns; discarded mule spindles and installed 11,200 ring spindles.

Middleton. Beverly Cotton Mill; 5,000 spindles added.

Monroe. Monroe Cotton Mills replaced 150 36 inch looms with new 40 inch looms.

Monroe. Walton Cotton Mill Co. added 10 cards and 2 pickers and replaced 300 old looms with new.

Roswell. Roswell Mfg. Co.; Sheetings, Shirtings and Yarns; capital stock increased to $450,000; erected power house; installed new roving machinery.

Summerville. Summerville Cotton Mills; Ducks; built addition; installed 7,000 spindles and 150 looms.

Tallapoosa. Tallapoosa Mills, Inc.; Cotton Yarns; added 1,056 spindles.

Trion. Trion Co.; Sheetings, Drills and Osnaburgs; add 54 spinning frames.

West Point. West Point Mfg. Co.; Duck; built 316 x 70 ft. 2-story brick cloth room and bleachery.

Kentucky, Louisville. Puritan Cordage Mills Co.; increased capacity 12 per cent.; additional carding and spinning machinery installed; C. T. Wolfe, mgr.

Louisville. Ten Broeck Tyre Co.; installed 1,600 ring spindles for making yarns in addition to tire fabrics.

Louisiana, New Orleans. Maginnis Cotton Mills; 6,000 additional spindles for manufacturing cotton sewing twine for company's bag factory.

Massachusetts, Boston. Commonwealth Thread Co.; increased capital stock from $4,000 to $40,000.

Charlton City. New England Batting Co.; cotton and jute batting; built 200 x 50 ft. mill and storehouse and installed new machinery to replace those lost by fire.

Chelsea. A. M. Greenway Co.; Elastic Webbing; built 29 x 41 x 19 ft. addition.

VITROLITE
"BETTER THAN MARBLE"

VITROLITE topped tables—Black Cat Textile Company's plant

VITROLITE TABLE TOPS MEAN EFFICIENCY—ECONOMY AND SANITATION

The Black-Cat Textiles Company, Taubel Bros., Wayne Knitting Mills, Phoenix Hosiery Mills, Wm. Brown, Dayton Hosiery Mills, Duplan Silk Company and many more are using Vitrolite for the tops of Sorting —Folding— Inspection and Boxing tables because it pays. Vitrolite can be cut to fit any table—is extremely hard—snow-white—stain and acidproof and will wear a lifetime.

Let us mail samples and prices

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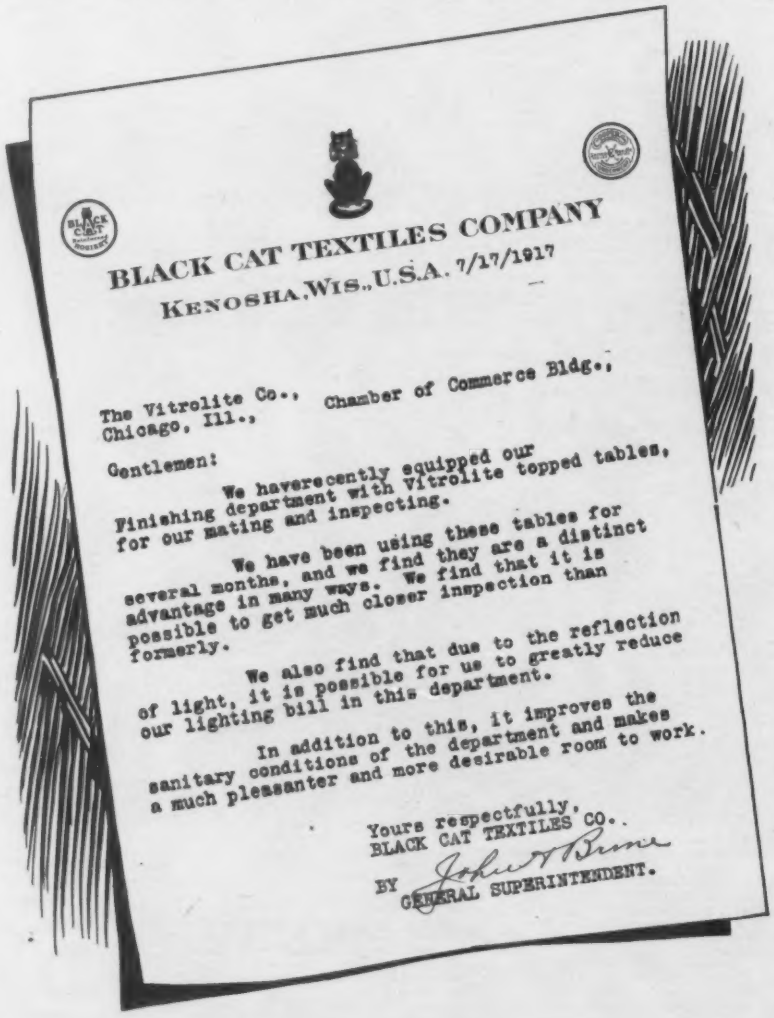


BLACK CAT TEXTILES COMPANY
KENOSHA, WIS., U.S.A. 7/17/1917

The Vitrolite Co., Chamber of Commerce Bldg.,
Chicago, Ill.,

Gentlemen:

We haverecently equipped our Finishing department with Vitrolite topped tables, for our mating and inspecting.

We have been using these tables for several months, and we find they are a distinct advantage in many ways. We find that it is possible to get much closer inspection than formerly.

We also find that due to the reflection of light, it is possible for us to greatly reduce our lighting bill in this department.

In addition to this, it improves the sanitary conditions of the department and makes a much pleasanter and more desirable room to work.

Yours respectfully,
BLACK CAT TEXTILES CO.,
BY John W Brine
GENERAL SUPERINTENDENT.

Fall River. Laurel Lake Mills; 20,000 tape driven spindles to replace old machines.
Fisherville. The Lund Textile Co.; addition 60 x 27 ft., one story high; 16 new looms.
Hyde Park. Carl Stohn; brick addition 42 x 110 ft., two stories high; 50 new looms.
Lawrence. Atlantic Mills (Pacific Mills Co.); 150 cards and 30,000 spindles installed for making coarse count cotton yarns for Government duck, and mill started up.
Millbury. Cordis Mills; Tickings; built 145 x 50 ft. storehouse.
Millbury. West End Thread Co.; purchase Mayo Mill No. 2 and install new braiding machines.
New Bedford. Manomet Mills; Cotton Yarns; erecting 130 x 60 ft. two-story building; will install 39 cards and 24 combers.
New Bedford. The Nashawena Mills; Fine Cotton and Silk Goods; three-story addition to picker house installed new silk throwing plant, capacity 5,000 lbs. per week: increased equipment to 45,000 mule spindles, 157,320 ring spindles and 3,510 looms.
New Bedford. New Bedford Textile Co.; Hook Braids and Banding; increased capital to $25,000; erected two-story addition.
New Bedford. Nonquitt Spinning Co.; Combed Yarns; ordered 25,000 new spindles and preparatory machinery.
Shirley. Samson Cordage Works; Braids, etc.; erected new mill to replace old and added 10 spinning frames.
Westboro. Joseph S. Mason & Sons; addition to weaving mill.
Worcester. Wachusett Thread Co.; addition to boiler house, 75 x 40 ft.
New Hampshire, Keene. International Narrow Fabric Co.; damaged by fire to extent of $12,000; plant repaired.
Newmarket. Newmarket Mfg. Co.; Cotton Fancies; 451 x 360 ft.; weave shed, one story high; 20,000 new ring spindles to replace old style.
Suncook. Suncook Mills; Sateens, Shirtings, etc.; built 108 x 64 ft. addition and installed 140 new looms.
New Jersey, Cedarville. C. C. Ball; Dress Goods, Shirtings and Towels; erected new weave shed and added 50 looms for manufacture of Dress Goods in addition to Towels.
Gloucester. Argo Mills Co.; Cotton Yarns; replaced old winding machinery with new.
Mays Landing. Mays Landing Water Power Co.; new mill 135 x 100 feet, one story high, of reinforced concrete; 100 looms added; will enlarge mill to three stories later.
Newark. John H. Meyer Tire Duck Co.; $400,000; John H. Meyer, pres.-treas.; Jerome T. Rutledge, agent, supt. and buyer; Tire Fabrics and Cotton Duck; completed new mill and started up in June, increasing original number of machines to 6,000 spindles and 250 looms.
New York, Lockport. Empire State Linen Mills, Inc.; built addition and added 24 draper looms.
Long Island City. Globe Thread Co.; erected brick mill, 50 x 140 ft.; cost $15,000; double capacity.
Oswego. Oswego Yarn Mills; equipment increased to 6,500 spindles.
Troy. Troy Yarn Co.; started up annex on River Street with 4 sets 60-inch cards and 4 mules.
North Carolina, Belmont. Climax Spinning Co.; added 4,350 new spindles.
Belmont. The Majestic Mfg. Co.; added 6 new cards and two combers.
Bessemer City. The Osage Mfg. Co.; Sheetings; added 6 spinning frames to equipment.
Bladenboro. Bladenboro Cotton Mills, Inc.; increased from 20,000 to 22,000 ring spindles.
Bynum. The J. M. Odell Mfg. Co.; new mill building erected, 200 x 50 ft., 2 stories; 5,200 spindles installed. This replaces plant previously destroyed by fire.
Charlotte. Calvine Mill of Chadwick-Hoskins Co.; erect new building to replace old.
Cliffside. Cliffside Mills added 2 new fly frames and 4 spinning frames.
Concord. Brown Mfg. Co.; built new addition to plant for slashing, drawing in, beaming and dyeing depts.
Concord. Buffalo Mills; erected new addition; removed machinery from old building; added 2 new spinning frames.
Conover. Yount Cotton Mills; new building erected here, 200 x 80 feet, and plant moved from Walterboro, S. C., to this place. Also built number of operatives cottages.
Cumberland. The Necronsett Mills, Inc.; new addition, 100 x 55 feet, giving additional floor space of 20,000 square feet; new machinery installed, including 5,000 spindles for making combed yarns; will be finished by May, 1918.
Draper. German American Mills; Cotton Blankets and Yarns; new weave shed erected and 200 new looms installed.
Fayetteville. Holt-Williamson Mfg. Co.; built addition to yarn mill and operate 84 knitting machines making knit wristing; dye (raw stock); L. P. Muller & Co., selling agents.
Fayetteville. Tolar-Hart & Holt Mills; Hosiery Yarns; increased capital stock from $200,000 to $300,000.
Forest City. Florence Mills; Napped Goods, Chambrays, etc.; Yarns; built addition 40 x 40 ft. to dye house; installed new raw stock dryer.
Franklinton. Sterling Cotton Mills; Ball Warps, and Skeins; increased capital stock from $200,000 to $1,000,000; will make enlargements to plant.
Gastonia. Gray Manufacturing Co.; Cotton Yarns; increased capital stock from $175,000 to $600,000.
Gastonia. Rex Spinning Co.; added 22 new cards, 12 combers, 10 speeders and 16 twisters; erected new addition, 130 x 150 feet.
Greensboro. Pomona Mills, Inc.; Fancy Dobby Shirting; new picker machinery and carders have been installed.
Henderson. Harriet Cotton Mill No. 2; added Foster winder frames and 6 new spinning frames; also built several new operatives' houses.
High Point. Highland Cotton Mills; new mill built for combed yarn; 12,000 spindles; (expected to start up during December).
King's Mountain. The Dilling Cotton Mills elected A. G. Myers pres.; E. Dilling, vice-pres.; W. T. Love, sec. and treas.; recently released from hands of receivers; to add roving machinery and combers
Lexington. Erlanger Cotton Mills; new 2-story building erected; added 5,000 more spindles for making yarns.
Lowell. The Peerless Mfg. Co.; installed 2,016 spinning and 1,008 twisting spindles.
Lumberton. The National Cotton Mill; made addition to floor space; installed 3,000 new spindles.
Maysworth. The Mays Mills, Inc.; increased capital stock to $1,000,000; completed addition of No. 2 mill; equipped with 25,000 spindles for making combed yarns.
Mooresville. Dixie Cotton Mill Co.; built addition to mill; added 1,440 new spindles.
Morganton. Alpine Cotton Mill No. 2; new warehouse erected, 100 x 50 ft.
Mount Holly. Albion Cotton Mills Co.; added 2 intermediate and 1 fly frame to card room.
Roanoke Rapids. Roanoke Mills Co.; erecting No. 2 mill, 542 x 158 ft.; boiler house, warehouses and 45 tenement houses; installed 23,184 spindles.
Rutherfordton. Cleghorn Mills; erected brick addition to replace an old weave shed; machinery moved to same.
Selma. The Lizzie Cotton Mills and the Ethel Cotton Mills have installed electric drive in both plants. Capital increased to $200,000.
St. Pauls. St. Pauls Cotton Mill Co.; 200-ft. addition built to plant and capacity increased.
Wake Forrest. Royall Cotton Mills; changed from steam to electric power.
Wilmington. Delgado Mills; new 2-story addition erected, 120 x 48 ft.; installed 3,500 additional spindles and 100 looms for making Dress Ginghams.
Pennsylvania, Allentown. Allentown Spinning Co.; Jute Carpet and Rug Yarn and Twine; new $25,000 warehouse, 50 x 200 ft.
Mount Joy. George Brown's Sons; Cotton Goods; erected new addition to plant and machinery; greatly increased capacity.
North Wales. Acorn Web Mills, Inc.; built an addition 40 x 50 ft., 2 stories, to plant.
North Wales. Montgomery Mill Plant (L. H. Gilmer Co., Philadelphia); Webs and Tapes; erected one-story and basement mill building.
Philadelphia. Baxter, Kelly & Faust Tioga and C Sts.; Cotton Plushes; erected new one-story brick building for bleachery; automatic machinery installed.
Philadelphia. Harry D. B. Clapp & Co., Inc., 824 No. American St.; Cotton and Woolen Waste; rebuilt warehouse destroyed by fire.
Philadelphia. L. H. Gilmer Co. (Tacony); erected new 2-story building to plant at this place and installed new machinery; also new 1-story and basement addition, 67 x 72 ft., made to mill at North Wales, Pa.
Philadelphia. Henry Goldthorp; removed to Jasper and Orleans Sts. from 2615 Fairhill St.; plant greatly improved.
Philadelphia. John W. Kershaw Co.; Turkish Towels; removed plant to 1722-34 No. 5th St.; operating 140 looms, with motor drive.
Philadelphia. Ontario Spinning Co., Second St.; Cotton Yarns; added 1,300 new spindles and new winders.
Philadelphia. Fred Pearson & Co., Inc., Leverington Ave., Manayunk; erected new dye house, one story, brick, 55 x 110 ft.
Philadelphia. Prospect Mills No. 2, Frankford, Kinsey and Josephine Sts.; annex of the Prospect Mills; Edwin Wood, supt.; Royal Mitcheline Quilts; 22 broad looms.
Philadelphia. John Sidebotham, Inc., 4317 Griscom St., Frankford; taken over entire building and installed additional machinery for manufacturing tapes.
Philadelphia. The Manning J. Smith Belting Co., 39 E. Ashmead St.; installed a number of narrow and broad looms for manufacturing cotton belting.
Philadelphia. Stead & Miller Co.; Upholstery Goods; erected new addition 60 x 92 ft., brick, 6 stories.
Philadelphia. United States Thread Co.; 241 Arch St.; installed equipment for doing own bleaching and dyeing; increased capacity in all departments.
Rhode Island, Auburn. United Lace & Braid Co.; addition 90 x 200 ft.; cost $75,000.
Canonchet. Canonchet Line & Twine Co.; built 600 x 32 feet twine walk to replace one destroyed by fire; also boiler and power house and 30 x 60 ft. finishing and packing house.
Central Falls. Sewing Thread Co.; erected new building, 100 x 32 ft., two stories.
Central Falls. Wayposet Manufacturing Co.; one-story addition to mill building.
Coventry Center. Cowen Braid Co.; increased capital to $100,000; installed 325 new braiding machines.
Harris. Interlaken Mills; 374 Draper looms, 8,300 spinning frames, to replace old machinery.
Pawtucket. Crown Manufacturing Co.; Cotton Yarns; addition.
Warren. French Manufacturing Co.; Sewing Threads; leased additional space and installed new machines.
Westerly. Westerly Textile Co.; purchased mill near plant; new twisting machinery installed; three-story addition to main plant to be erected.
Woonsocket. Anchor Webbing Co.; increased capital to $150,000; added 5 looms; (opened Pawtucket branch).
South Carolina, Greenville. Conestee Mills; reported built addition, 80 x 40 ft.; installed 108 new looms.
Greer. Franklin Mills; new officers elected as follows: W. E. Mason, pres.-treas.; M. B. Cunningham, sec.; added 148 looms and 2 spinning frames.
Piedmont. Piedmont Manufacturing Co.; 47 new Whitin cards, 180 deliveries of drawing machinery; new boiler room; two new boilers installed.

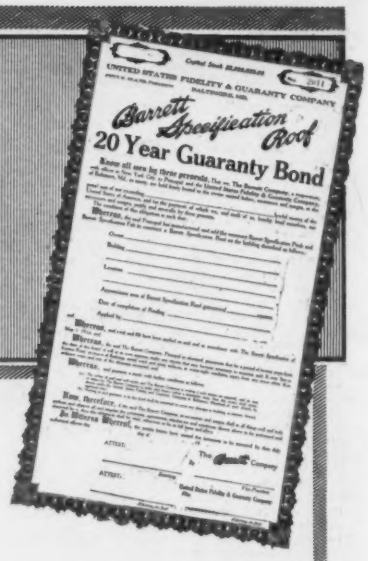
NEW MILL AND OFFICE BUILDING OF CROWN MFG. CO., PAWTUCKET, R. I.

Seneca. Victor-Monaghan Mills; added 768 spindles; will replace 450 Draper looms with new ones.
Spartanburg. Beaumont Mfg. Co.; built addition.
Spartanburg. Spartanburg Bagging & Waste Co.; added $4,000 equipment to cotton pickery; daily capacity 20 bales.
Walhalla. Monaghan Mills; opening room; C. O. B. machine installed, adding 5 new cards; supply room erected.
Winnsboro. Winnsboro Cotton Mills; addition (entirely new building); 10,000 spindles, 16 looms.
Texas, Brenham. South Texas Cotton Mills; addition built to plant. Added 50 new looms and 1,000 new spindles.
Dallas. Fulton Bag & Cotton Mills; erected a five-story addition, 100x50 feet, for purpose of increasing facilities for making cotton cloth and bags.
Vermont, Burlington. Queen City Cotton Co.; one-story addition to main mill.
Virginia, Alta Vista. Alta Vista Cotton Mills; will add department for tire yarn; machinery to cost $75,000.
Wisconsin, Berlin. The Berlin Fabric Mfg. Co.; Cloth Novelties; increased capital stock from $50,000 to $150,000.
Canada, Ontario, Cornwall. Canada Mill (Canadian Cottons, Ltd.); built new weave shed; 300 additional looms.
Georgetown. H. Corke & Co., addition to double capacity; new 60 in. card and new mule installed.
Guelph. Dominion Linens, Ltd.; addition 100 x 125 ft. for cotton spinning department.
Hamilton. Ontario Mill (Canadian Cottons, Ltd.); 3,000 ring spindles installed to replace equal number of old frames.
St. Lambert. Dominion Textile Co.; new plant to be established; mill building to cost $2,000,000; equipment, 10,000 spindles, 2,500 to 3,000 looms; total expenditure involved, $2,790,000.

WOOLEN.

Connecticut, Bozrahville. Gilman Bros.; Shoddy; addition one story high, 40 x 96 feet.
Norwich. Joseph Hall & Son; Cassimeres and Overcoatings; erecting new weave shed; 26 x 43 ft., two stories high, of brick and steel.
Stafford Springs, Conn. Cyril Johnson Woolen Co.; transferred wool sorting department to Stafford plant and installed 15 new looms.
Yantic. Millbrook Woolen Mills; Cloakings and Overcoatings; improved plant and installed new machinery.
Illinois, Chicago. Illinois Felt Co.; moved into new building; added 2 garnett and 1 filling machine.
Maine, Corinna. Corinna Mfg. Co.; Cotton Warp Sackings and Men's Wear; added 20 looms, and 1 card.
Houlton. Houlton Woolen Mill; changed from manufacture of Sweaters, etc., to Overcoatings.
North Vassalboro. Vassalboro Mills of American Woolen Co.; built 60 x 247 ft. four-story brick addition.
Pittsfield. American Woolen Co.; leased Pittsfield Yarn Co. plant.
Waterville. Wyandotte Worsted Co.; built 120 x 70 ft. three-story addition, costing $19,000.
Wilton. Wilton Woolen Co.; Cashmerettes; added 3 looms.
Massachusetts, Clinton. Earnsdale Worsted Co.; built small addition to weave room.
Clinton. Roubaix Mills, Inc.; Worsteds; erected new dye and finishing house, 150 x 50 ft., one story high, costing $15,000; new carbonizing machine and boiler installed; also 12 looms.
Franklin. Clark - Cutler - McDermott Co.; horse blankets; 50 x 42 ft. one-story and basement and 120 x 65 ft. one-story additions; also wood storehouse, 30 x 70 ft.
Holden. Holden Woolen Co.; addition to storage building, 60 x 120 ft.
Holliston. Holliston Woolen Mills Co.; Thibets, Kerseys, etc.; built 60 x 23 ft. two-story addition.
Holyoke. Farr Alpaca Co.; Alpacas, Mohairs and Lustres; built 70 x 150 ft. one-story and basement addition; no new machinery.
Lowell. Tremont & Suffolk Mills; Flannels, Blankets, Ribbed Underwear; additions to No. 2 mill of brick construction, five stories high, to cost $25,000; also one-story weave shed, 337 x 182 ft., costing about $80,000.
Medway. Fabyan Woolen Co.; added 12 looms.
Medford. Medford Woolen Mfg. Co.; Half Hose and Lumbermen's Socks; increased capital to $100,000; added 3 sets of cards, 1,760 spindles, 100 knitting machines and 100 sewing machines.
Northboro. Taylor Mfg. Co.; Overcoatings, Blankets, etc.; new weave shed, 112 x 63 ft., one story high, brick and concrete; 24 broad and 16 narrow looms added.
Northboro. Whittaker & Bacon; purchased Arlington Mill of the DuPont Co.; installed 4 garnetts, 12 cards and 4 pickers.
Southbridge. Hamilton Woolen Co.; Cassimeres; built 84 x 160 ft. mill building and 52 x 50 ft. addition.
Uxbridge. Waucantuck Mills; Fancy Worsteds; installed 600 Bradford worsted spindles with the complete set of gilling and drawing machinery.
Wales. Grant S. Kelley Woolen Mills, Inc.; put Dell Mill in operation as branch plant.
Webster. Daniel E. Cummings; Shoddy; addition increasing capacity by 12,000 lbs. a week.
Minnesota, Duluth. Patrick Duluth Woolen Mills; installed 26 additional looms, transferring carding and spinning, etc., from Mankato Mill and will close down that mill early in 1918.
New Hampshire, Ashuelot. Hampshire Woolen Co.; Cassimeres; increased capital from $50,000 to $75,000.
Somerworth. Great Falls Woolen Co.; added 600 mule spindles.
Tilton. Tilton Mills; replaced 27 old style looms with new; installed 2 new boilers.
New Jersey, Garfield. Garfield Worsted Mills; increased capital from $1,500,000 to $2,500,000.
Passaic. Botany Worsted Mills; four-story concrete addition, for offices, stockroom and small amount of finishing machinery.
New York, Amsterdam. Shuttleworth Bros. Co.; added 70 looms, 4 sets woolen cards, 4 mules.
Cohoes. Star Woolen Co.; addition to cost $7,000.

Barrett Specification Roofs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BALTIMORE, MD.
Barrett Specification Roof
20 Year Guaranty Bond
Know all men by these presents, That we, The Barrett Company, a corporation
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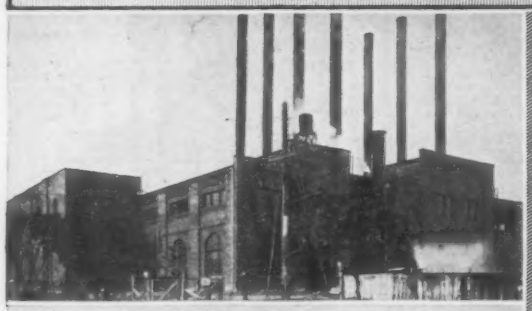


MAIN AVENUE HIGH SCHOOL

In San Antonio, for instance—

IN EVERY American city the principal new buildings are covered with Barrett Specification Roofs. On the large flat areas of such edifices this type of roofing wins on the figures, being low in its first cost, permanent, reliable and having no maintenance costs whatever.

In San Antonio, for example, the principal new buildings of the last year are shown here—three handsome schools, a powerhouse, a large grocery, a warehouse, a large publishing-building—and they all have Barrett Specification Roofs.

All of these roofs carry Barrett 20-Year Guaranty Bonds. The procedure is as follows:

> The owner puts into his building specifications the clause, "The roof shall be laid according to The Barrett Specification dated May 1, 1916, and the roofing contractor shall secure for me the 20-Year Guaranty Bond therein mentioned."

Only competent roofers can obtain the bond and Barrett inspectors visit the job to see that the specification is followed.

On their certification of the contractor's due compliance with The Barrett Specification, the 20-Year Guaranty Bond is issued by one of the largest surety companies in America.

The bond costs the contractor and the owner nothing. It is issued in the interest of good materials and good workmanship, and we pay for it.

20-Year Guaranty Bond

The 20-Year Guaranty is given on all Barrett Specification Roofs of fifty squares and over in all towns in the United States and Canada with a population of 25,000 and over, and in smaller places where our Inspection Service is available.

Our only requirements are that the roofing contractor shall be satisfactory to us and that The Barrett Specification of May 1, 1916, shall be strictly followed.

Further information and copies of The Barrett 20-Year Specification, with roofing diagrams, sent free on request.

The Barrett Company

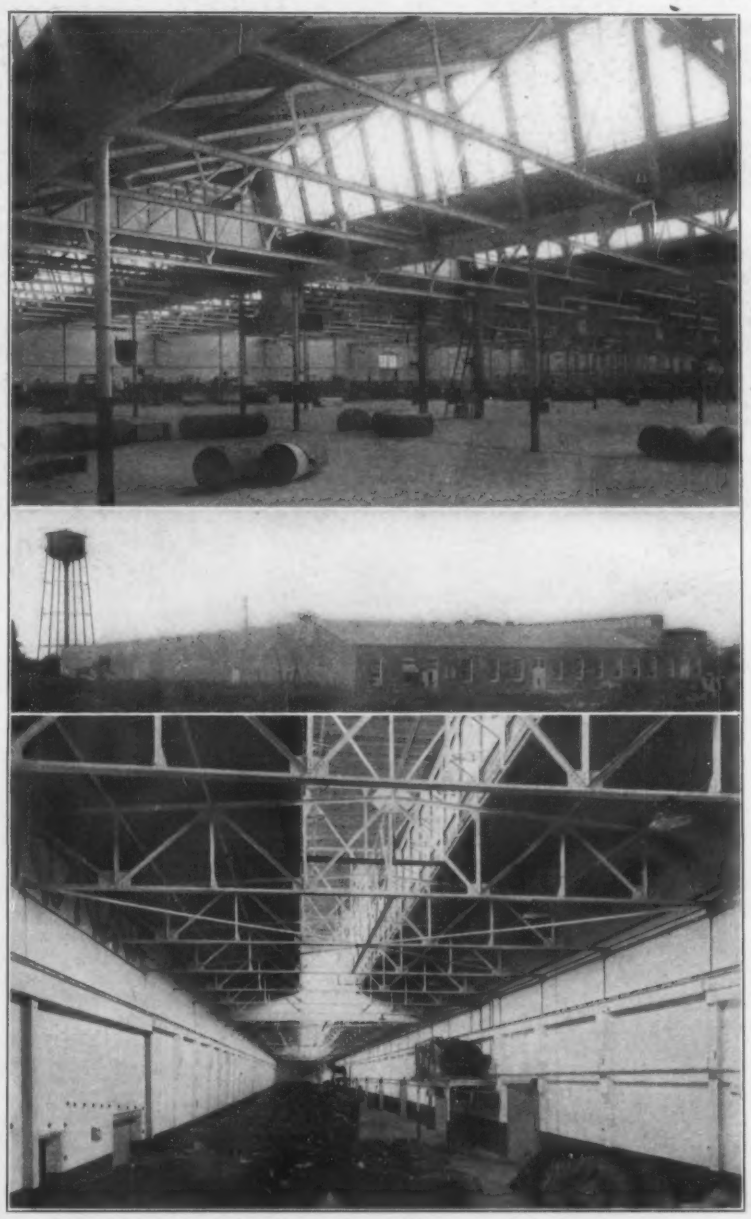
New York Chicago Philadelphia Boston St. Louis Cleveland Cincinnati Pittsburgh Detroit Birmingham Kansas City Minneapolis Nashville Salt Lake City Seattle Peoria

THE BARRETT COMPANY, Limited: Montreal Toronto Winnipeg Vancouver St. John, N. B. Halifax, N. S. Sydney, N. S.

The buildings illustrated, reading from top, are as follows:

POWER-HOUSE OF SAN ANTONIO GAS AND ELECTRIC CO.—*Roofers: Foden Roofing Co., Houston, Texas.* LAMAR STREET SCHOOL.—*Archs: Adams & Adams; Gen. Cons.: Wright & Sanders; Roofers: Turner Roofing & Supply Co.* JOHN FEST BUILDING.—*Arch.: Atlee B. Ayres; Gen. Con.: J. P. Haynes; Roofers: Turner Roofing & Supply Co.* DAILY EXPRESS BUILDING.—*Archs.: August A. Herf Co. and Alfred Giles Co., Ass.: Gen. Cons.: Western & Koeger; Roofers: Turner Roofing & Supply Co.* MAIN AVENUE HIGH SCHOOL.—*Arch.: Ralph H. Cameron; Gen. Con.: B. Schoenfeld; Roofers: Henry Vodrie.* FREIGHT WAREHOUSE OF SAN ANTONIO BELT AND TERMINAL RAILWAY. *Gen. Cons: Thomas & Jones; Roofers: Turner Roofing & Supply Co.* BRECKENRIDGE HIGH SCHOOL.—*Archs.: Alfred Giles Co. and C. V. Seutter; Gen. Cons.: Wright & Sanders; Roofers: Turner Roofing & Supply Co.*

Jamestown. Chautauqua Worsted Mills; Worsted Yarns; added 50,000 sq. ft. floor space; new electrical power plant.
Utica. Globe Woolen Mills; addition 100 x 36 ft., three stories high.
Valatie. Valatie Yarn Co.; installed 480 new spindles and 2 sets cards.
Waterloo. Waterloo Woolen Manufacturing Co.; rebuilt mill destroyed by fire.
North Carolina, Elkin. Chatham Mfg. Co.; erecting new three-story building, 80 x 300 ft., to install 100 looms and complementary machinery for blankets.
Ohio, Cleveland. The National Woolen Co.; built brick warehouse, 80 x 130 ft.; 30 x 20 ft. laboratory; office, 20 x 30 ft.
Oregon, Oregon City. Oregon City Mfg. Co.; have erected new building, 80 by 250 ft., 2 stories; first floor machine shop, storage and welfare rooms; second floor, weave room; third floor, garment factory; 35 new looms and additional sewing machines installed; old machinery thoroughly overhauled.
Portland. Portland Woolen Mills; Blankets, Flannels, Meltons; purchased machinery of the Brownsville (Ore.) Woolen Mills; 2 sets, 12 looms, 2 pickers.
Pennsylvania, Bridgeport. James Lees & Sons Co.; increased capital stock from $1,000,000 to $1,500,000; improvements to be made to mill, including filter plant.
Clifton Heights. Caledonia Worsted Mills; Cotton Worsteds and Wool Mixed Goods; built new 2-story brick addition, 35 x 56 feet; dye house and quilling room.
Darby. Griswold Worsted Co.; new one-story brick building erected; installed Permutit water softener system.
Lewisburg. Lewisburg Mills, men's wear; purchased plant operated under lease.
Norristown. The Coral Mfg. Co., art squares, rugs, etc.; installed machinery for mercerizing and will also do work for the trade.
Philadelphia. Bellevue Worsted Mills, Hunting Park Ave. and 16th St.; worsted and cotton goods; erecting new main mill building and dye house, 410 x 60 feet, three stories; also new building for power plant; to add new Northrop Draper magazine looms.
Philadelphia. M. I. Davison Co., Shackawaxon and Wildey Six (manufacturing hair cloth); installed 16 broad looms for making men's worsted wear and ladies' dress goods.
Philadelphia. J. Milton Hagy Waste Works, Swanson St.; erected new brick and steel tank tower and tank.
Philadelphia. James Lees & Sons Co. (Bridgeport, Penn.); branch plant established in Borgdell Bldg., 16th and Callowhill Sts.; installed 3,200 spinning spindles.
Philadelphia. Geo. W. Lefferts & Co., Inc.; Woolen Yarns; rented additional space at Sixth and Moore Sts.
Philadelphia. Myers-Jolisch Co., Inc.; Davenport Mills, removed to Indiana and A Sts.; Woolen and Worsted Dress Goods; installed 20 new looms.
Philadelphia. Hugh Nelson, Third and Huntingdon Sts.; Ingrain Carpets; purchased equipment of Martin & Gaw, retired.
Philadelphia. Prudential Worsted Mills, Orthodox and Largo Sts., Frankford; built large addition to mill and installed 100 more looms.
Philadelphia. Jonathan Ring & Son, Inc., 1759 Hancock St.; Woolen and Merino Yarns; erected new one and two-story brick addition, about 25 x 105 feet, to their plant.
Philadelphia. Mark D. Ring's Sons Co., Third and Somerset Sts.; Woolen and Merino Yarns; purchased equipment (6 sets cards and 6,000 mule spindles) of the Coaquanock Mills, which have been dissolved.
Philadelphia. Frank J. Sheble, East Thompson and Clearfield Sts.; Yarns; purchased plant of H. B. Thomas, Howard and Berks Sts.
Philadelphia. Rooba Textile Co., Inc.; Men's Wear and Dress Goods; established branch plant at Adams and Jasper Sts.; equipped with 40 broad looms.
Worthington. Peter Graff & Co.; Blankets and Flannels; added one set 60-inch cards, 2 broad looms, 1 napping machine.
Rhode Island, Oneyville. Centredale Worsted Mills; purchased plant of Continental Worsted Mill to be used as storehouse.
Woonsocket. The Alsace Worsted Co.; addition to storehouse, 30 x 40 feet, one story high.
Woonsocket. Dunn Worsted Mills; Suitings and piece-dyed Men's Wear; new machinery for dyeing worsted tops installed.
Woonsocket. Guerin Spinning Co.; addition 60 x 125 feet.
Woonsocket. River Spinning Co.; addition 60 x 28 feet for shipping department.
Woonsocket. Scotia Worsted Co.; dye-house 23 x 140 feet; cost, $13,000.
Woonsocket. Sydney Worsted Co.; addition 64 x 20 feet; cost, $5,000.
Woonsocket. Uxbridge (Mass.) Worsted Co.; remodeled plant and widened mill building 15 feet, giving 1,700 square feet of floor space; new machinery will be installed.
Woonsocket. Woonsocket Spinning Co., Inc., taken over by Ovide Richard-Tessier; new mill 123 x 210 feet; boiler house 22 x 32 feet; Woolen and Merino Yarns.
South Carolina, Greenville. McGee Manufacturing Co.; added 3,000 spindles; disposed of waste machinery.
Vermont, North Montpelier. Little Woolen Co.; new mill 128 feet long; cost, $20,000.
Washington, Washougal. Washougal Woolen Mills; addition 60 x 78 feet, three stories high; equipped with carding and spinning machinery.
Wisconsin, Baraboo. Island Woolen Co.; Men's Wear; new building erected, 58 x 112 feet, 4 stories; also addition 40 x 80 feet, 4 floors to main mill; added 4 new sets 60-inch cards, 19 looms, 1,320 total spindles; plant now equivalent to 15 sets 48-inch cards.
Prairie du Chien. Prairie du Chien Woolen Mill Co.; Dress Goods, Blankets, etc; doubled floor space, reconstructed power plant; installed 250 h.p. steam generating unit with 250 h.p. boiler and 250 k.w. dynamo; purchased an additional building and fitted same up for picker room, garnetting and storage room for wool.
Canada, Ontario, Lindsay. Horn Bros. Woolen Co., Ltd.; new mill to replace burned structure; 7,000 square feet of floor space, two stories high; 17 looms, 2 sets of cards and accompanying pickers, mules, etc.; Wheeling Yarn in 2 and 3-ply; also Mackinaws, Cloth, Blankets and Cloakings.
Perth. Boyd, Caldwell & Co., Ltd.; mill enlarged; equipment increased to four sets of 60-inch cards and 24 looms; head office moved from Lanark, Ont., to Perth.
Peterborough. Bonner-Worth Co., Ltd.; new mill building, 300 feet long, three stories high; equipped with machinery for spinning yarns on the French system.

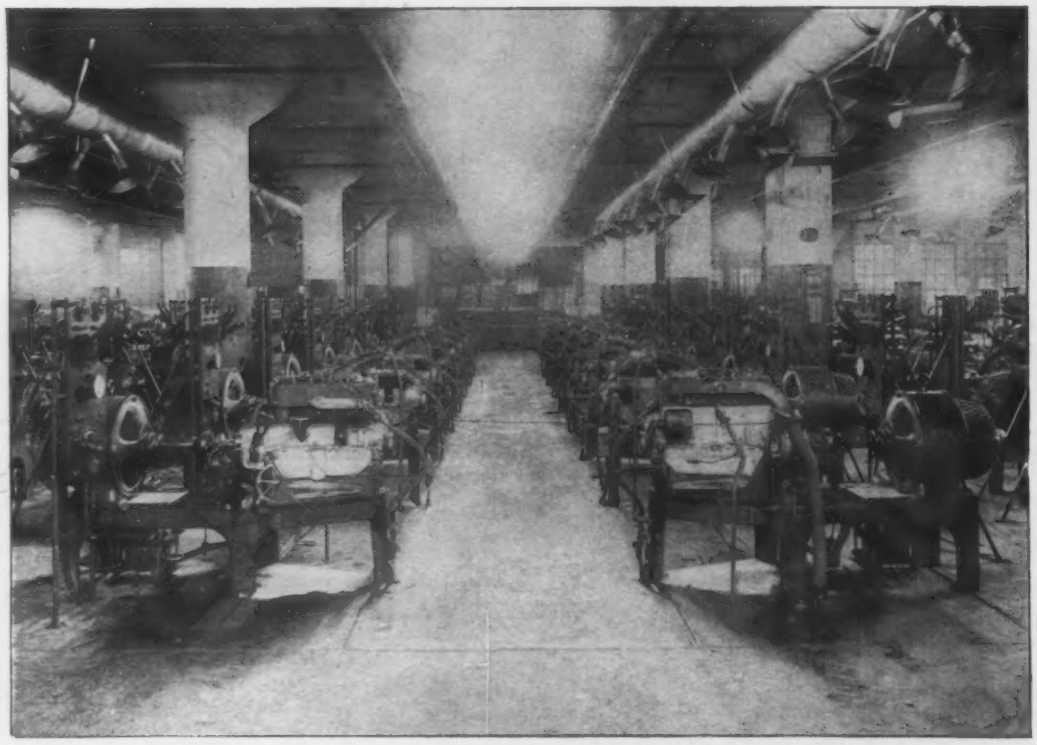


NEW WEAVE SHED AND RECEIVING AND SHIPPING BUILDING OF BRIGHTON MILLS AT ALLWOOD, N. J. TOP, INTERIOR OF WEAVE SHED; BOTTOM, INTERIOR OF RECEIVING AND SHIPPING BUILDING; TRAVELING CRANE RUNS LENGTH OF BUILDING AND HANDLES ALL MATERIALS OVERHEAD

KNITTING

Alabama, Anniston. The Anniston Knitting Mills Co.; increased capital stock to $85,000; new two-story brick building to be erected and 100 new machines installed.
Talladega. Hicks Hosiery Mills; replaced old machinery wtih entirely new equipment; increased daily capacity to 1,000 dozen pairs hose.
California, San Francisco. A. G. Spalding & Bros. Mfg. Co.; erected new building; increased from 10 to 23 knitting machines; making extensive line of Bathing Suits.
Georgia, Griffin. Griffin Hosiery Mills; built 45 by 20-ft. finishing room and installed 35 new knitters.
Douglasville. Douglas Hosiery Mills; erected new mill to replace old one; added 10 knitting machines and ordered more knitters, dye machinery, and boiler engine.
Rome. The Rome Hosiery Mills; increased equipment to 340 knitters, 109 ribbers, 16 sewing machines, 38 ribbers; erected 60 x 80-ft. addition.
Illinois, Chicago. Earnshaw Knitting Co.; adding additional knitting machines for Children's Underwear.
Chicago. Paramount Knitting Co.; increased capital stock from $600,000 to $1,000,000; Henry Pope, president; Cotton Seamless Hosiery (Bear Brand).
Chicago. Royal Knitting Mills; leased new building, adding 8 new knitting machines.
Mount Vernon. Illinois Knitting Co.; capital stock increased to $200,000; built 200 x 100-ft. addition; old plant used for dyeing and finishing; added 250 knitting machines and 30 loopers.
Indiana, Fort Wayne. Anthony Hosiery Mills; increased equipment by adding 24 knitting machines, 4 looping machines, 1 dry box and steam press; manufacturing Artificial Silk Hose in addition to regular lines; Charles F. Smith, superintendent.
Richmond. Atlas Underwear Co.; new three-story mill of pressed brick; 200 additional operatives.
Maryland, Frostburg. Parker Hosiery Mill No. 2; doubled floor space and added 50 knitters, 50 ribbers, and 14 loopers.
Massachusetts, Attleboro. R. Wolfenden & Sons, dyers and bleachers; built three additions, 40 x 140 ft., two stories, to spooling department; 20 x 140 ft. to dye-house, 87 x 68 ft. to boiler house; 150 h.p. boilers installed.
Mattapan. Peerless Knitting Co.; addition 40 x 30 feet; for finishing Department 1; added 7 knitting machines, and 15 sewing machines.
Millbury. A. D. Windle Co.; erected new storehouse, 40 x 80 ft., and scouring plant, 36 x 125 ft., both one-story high.
Reading. Middlesex Knitting Co.; Sweaters and Bathing Suits; capital stock increased from $10,000 to $25,000; leased additional storage space.
Springfield. Potter Knitting Co.; purchased plant of Blood Knitting Co at Ellsworth, Mo.; equipment, comprising 45 latch knitting machines and 30 sewing machines, shipped to Springfield plant.
Stoughton. Shawmut Woolen Mills; Jersey Cloths; instaled 6 new circular and 4 latch-needle knitting machines and 21 sewing machines.
Waltham. American Knitting Co.; increased capital from $25,000 to $50,000.
Waltham. Clayton Manufacturing Co.; Union Suits and Two-piece Garments; add 3 knitters and 6 sewing machines; incorporated for $50,000; damaged by fire and repaired.
Westfield. Atwater Knitting Co.; leased additional floor space; new sewing machines installed.
Michigan, Eaton Rapids. Big Rock Knitting Co.; installed 60 knitting machines in separate mill building for the manufacture of gloves.
Grand Rapids. Globe Knitting Works; Ribbed Underwear; new mill 130 by 120 ft. seven stories high; 25 new knitting machines.
Muskegon. Amazon Knitting Mills; Ribbed Underwear; capital increased to $400,000; added 6,600 spindles and 55 sewing machines.
Minnesota, Duluth. Nelson Knitting Works; erecting new mill, 50 x 80 ft., two stories high.
New Jersey, Boonton. Boonton Hosiery Co.; increased capital to $350,000; purchased additional building; add 25 new full-fashioned machines.
Blackwood. Blackwood Knitting Mills; have replaced old machines with up-to-date knitters.
Elizabeth. Joseph W. North & Son, Inc.; Nathan Schwartz purchases control and becomes president; 75 knitters and 50 sewing machines installed for manufacture of Jersey Cloths, in addition to former product of Underwear; Jersey Cloths sold direct.
New York, Amsterdam. Amsterdam Handmade Sweater Co., Inc.; Sweaters and Lumbermen's Socks; 6 knitters, 3 sewing machines; 1 looper; (purchased by F. J. Shuttis, addition erected and additional machinery installed).
Amsterdam. Blood Knitting Co.; erected addition 45½ x 178 ft., four stories; added 2,000 spindles and 50 sewing machines.
Amsterdam. Morris Mills; remodeled and rebuilt mill; installed enlarged garnetting department; new plant for manufacturing their own paste-board boxes.
Brooklyn. A. Spitzer & Son; Sweaters, Neckwear, etc.; moved to 268-270 Division street.
Brooklyn. Triangle Knitting Mills, Inc.; knitted Novelties; added 8 knitters and 8 sewing machines.
Brooklyn. Waltzfelder Co.; Fancy Knit Goods; add 15,000 sq. ft.; 25 new knitting machines.
Buffalo. Monarch Knitting Co., Ltd.; addition 200 ft., five stories; capacity increased about 50 per cent.
Cohoes. Fitwell Knitting Co.; built new storehouse, 40 x 85 ft.; cost $10,000.
Cohoes. Fuld & Hatch Knitting Co.; warehouse; cost $60,000.
Cohoes. Wright's Underwear Co.; four story addition; cost $60,000.
New York. Hub Knitting Mills, Inc.; moved to 134-136 Spring street; added 18 knitting machines, 20 sewing machines.
New York. Progress Knitting Mills; moved to 289-293 Sixth avenue; will add new machinery.
Norwich. Norwich Knitting Co.; increased capital to $400,000; leased and moved into new building.
Oswego. Lastlong Underwear Co.; increased capital to $100,000; added 5 sewing machines.
Utica. Augusta Knitting Co.; increased capital to $200,000; added 25 knitting machines.
Utica. Duofold Health Underwear Co.; increased capital to $400,000.
Utica. Ross-Hegan Knitting Corp.; added 60 sewing machines.
Utica. Utica Knitting Co.; addition 117 x 53 ft., three stories; cost $23,000; also purchased building of Capron Knitting Co.
Utica. Walnott Knitting Co.; reopened old plant at 5 Blandina street as Mill No. 2; 20 knitters, 45 sewing machines.
Warsaw. Brown Knitting Co.; increased capital to $100,000; addition 60 x 117 ft.; 20 new machines installed.
North Carolina, Cameron. Regal Hosiery Mills Co.; installed 40 Acme knitting machines and 6 Hepworth loopers.
Concord. G-H-Y Knitting Co.; Men's 240 Needle Half Hose; built addition to plant and installed 55 new knitting machines.
Drexel. Drexel Knitting Mills; incorporated with capital stock; $30,000; increased to 140 knitting machines.
Hendersonville. Freeze-Bacon Hosiery Mills; added 20 knitting machines; 24 loopers; new officers elected, with J. O. Bell president and R. P. Freeze treasurer.
Leaksville. Athena Knitting Mill; Underwear; building addition to house 5,184 spindles.
Newton. Fidelity Hosiery Mills Co.; installed new 125 h.p. boiler and additional machinery including 8 knitting machines.
Mebane. Durham Hosiery Mills; a new $25,000 brick addition built; installed additional machinery and increased capacity to 1,500 pairs hosiery per day.
Shelby. Olive Hosiery Mfg. Co.; to erect new dye house for dyeing and finishing product of the plant.
Wilmington. Wilmington Hosiery Mills; Men's and Women's Seamless Hosiery; built addition to plant increasing floor space one-third; added 40 new knitting and 4 looping machines.

Time Is Now More Than Money
—It Is Life—



Main View of an Engine Testing Room Lighted by Cooper Hewitt Lamps.
(Courtesy of Mr. W. A. Hill, E. E.)

This war is going to be won by *man-power*. To give the man in the factory poor light is the same kind of policy as giving the soldiers in the trenches poor ammunition.

Cooper Hewitt light is the one only *full* equivalent of the *best* daylight.

There is no drop in efficiency of labor when daylight gives place to Cooper Hewitt light. Whether for the closing hours of the afternoon, or the full night shift, the same quantity and quality of output comes through.

This fact is now just as firmly established as that a machine heavier than air can fly. Don't waste time doubting and arguing—*accept* proven facts.

BETTER THAN COOPER HEWITT LIGHT INCREASES PRODUCTION DAYLIGHT

Cooper Hewitt Electric Co.

8th & Grand Sts., Hoboken, N. J.

Boston.....161 Summer St.
Chicago.....215 Fisher Bldg.
Cincinnati.....First National Bank Bldg.
Cleveland.....Engineers' Bldg.
Detroit.....Ford Bldg.
Philadelphia.....Drexel Bldg.
Pittsburgh.....Westinghouse Bldg.
St. Louis..Central National Bank Bldg.

Ohio, Cleveland. Keller Knitting Co.; capital stock increased to $70,000; moved into larger quarters, 5100 Euclid avenue; added 7 new knitting machines; make high grade knit novelties in addition to Keller Coats and Keller Caps.

Columbus. The NuBack Fur Co.; Fur and Wool Knit Fabrics; added 10 knitting machines, 1 set cards; dyeing and wool washing machines; processing machinery.

Piqua. Imperial Underwear Co.; Men's Union Suits, etc.; increased capital stock from $150,000 to $300,000.

Piqua. The Superior Underwear Co.; Men's, Boys' and Children's Union Suits. Increased capital stock to $1,000,000. New buildings erected and capacity of plant doubled. To establish another branch mill at Covington, O.

Portsmouth. The Mitchell Mfg. Co.; Men's & Boys' Underwear; installed 10 new knitting and 12 sewing machines; increasing to 30 knitters and 60 sewing machines.

Toledo. Jos. Roth & Co.; Gloves and Mittens; erecting a new 3 story brick building; 140 x 110 ft.

Pennsylvania, Allentown. Wenecke Mills, Ltd.; Knitted Fabrics; J. H. Prescott elected pres. and supt., succeeding J. M. Beck; added $10,000 worth new machinery.

Ephrata. Glasser Hosiery Co.; (Reading); established branch plant here; Half Hose and Women's Seamless Hosiery; 65 knitters, 15 ribbers, 12 loopers.

Hawley. M. Wood; Fancy Knit Goods; new mill erected, 150 x 35 ft., 3 stories, replaces plant destroyed by fire.

Jonestown. A. R. Kreider & Bro.; (Annville); hosiery; purchased mill formerly occupied by Geo. Runyan; operate same as branch plant.

Manheim. Manheim Hosiery Co.; Half-Hose; purchased entire equipment of the Palmyra Hosiery Mills; increased equipment from 66 to 86 knitting machines, 16 ribbers, 15 loopers; 4 sewing machines; also finishing machinery; capacity 350 dozen per day.

Marysville. Unrivalled Hosiery Co.; Half-Hose; to build an addition 45 x 80 ft. and add 60 knitters, 12 ribbers and 12 loopers.

Middletown. H. A. Romberger Mfg. Co.; restarted plant destroyed by fire; purchased Old Market House and installed equipment; finishing and dyeing at this place.

New Castle. New Castle Knitting Mills; installed 39 new Scott & Williams machines in plant; also new machinery in the dye-house, giving capacity of 3,000 pounds per day.

Philadelphia. Colonial Knitting Mills; erecting three additions—149 x 70 ft., one-story; 192 x 73 ft., two-story, and 40 x 70-ft. power house.

Philadelphia. Falcon Knitting Mills; all kinds Sweaters; removed to larger quarters, N. W. Cor. Howard and Oxford Sts.; added 18 new knitting machines.

Philadelphia. Keystone Knitted Fabric Co., Ontario and I Sts.; Chinchillas, Boucle Cloth, Jersey Cloths; increased capital stock to $100,000; H. Haltermann now pres.; Henry Bahnsen, sec.; John Detjens, treas.; Arthur Gill, supt.; operate 50 knitting and 360 spindles.

Philadelphia. The Keystone Stocking Mills, Twelfth and Latena Sts.; added 25 knitters, 5 ribbers, 7 loopers and installed complete equipment of metal hosiery forms for finishing product.

Philadelphia. Edward Noon & Son, 4021 Germantown Ave.; Hosiery and Knit Goods; built three-story addition, 33 x 40 ft.; 10 new spindles and 10 new knitting machines.

Philadelphia. Philadelphia Sweater Mills; moved from North Howard St. to 715-719 Arch St.; increased facilities.

Philadelphia. Simons & Struve Hosiery Co., 4155 Frankford Ave.; Women's, Children's and Infants' Hosiery; replaced 100 old machines with new ones.

Philadelphia. E. Sutro & Son Co., Inc., East Thompson and Clearfield Sts.; Hosiery; purchased one-story factory building at 54th St. for extension of increased business.

Pottstown. E. Richard Meinig Co. (Reading); finishing department established here.

Reading. Berkshire Knitting Mills; addition 80 x 80 ft., to be equipped with full-fashioned machines.

WINDING ROOM IN NEW ADDITION TO HOME BLEACH & DYE WORKS, PAWTUCKET, R. I.

Reading. D. S. & W. Hosiery Co.; Half-Hose; new addition, 100 x 83 ft., 4 stories erected; electric; adding 125 new knitting machines.

Reading. Fisher Hosiery Co.; Ladies' Hosiery; purchased building formerly occupied by Hampden Knitting Mills; increased machinery equipment to 100 knitting machines and 3 sewing machines.

Reading. Gehrke Knitting Co.; Men's and Women's Hosiery; extension one story and basement, 100 x 26 ft., made to plant.

Reading. Pioneer Hosiery Mill; removed from 810 Windsor St. to larger quarters at Eleventh and Marion Sts.; increased equipment to 100 latch-needle knitting machines, 32 ribbers and 18 loopers.

Schuylkill Haven. Baker Bros. & Co.; Underwear; rebuilt plant destroyed by fire; now make high-grade Two-piece and Union Suits.

Schuylkill Haven. The S. Thomas Knitting Mill; installed new 100 h.p. engine, refitted old steam plant and made interior alterations; increasing production.

Scranton. Lackawanna Mills; Men's, Women's and Children's Underwear; erected large mill, doubled equipment of 8 sets, 19 flat, 35 x 60, and spring-latch needle machines.

Shippensburg. Shippensburg Knitting Co.; Hosiery; new mill 160 x 40 ft., under construction; expect to remove to same by April.

Rhode Island, Central Falls. United States Knitting Co.; addition 67 x 46 ft., three stories; 20 additional knitting machines.

Tennessee, Bristol. Bristol Hosiery Mills; addition for dyeing hosiery; installed machinery for manufacturing Half-Hose; planning to make future daily output 2,000 dozen pairs of Hose.

Loudon. Loudon Hosiery Mills; increased capital to $300,000; built 200 x 60-ft. brick building; machinery installed.

Utah, Salt Lake City. The Lloyd Knitting Mills; Underwear, Hosiery and Sweaters; have enlarged their plant and expended about $50,000 on new machinery, etc.; including several new automatic German machines.

Vermont, Bennington. Black Cat Textiles Corp.; addition 308 x 85 ft., five stories high; equipped with former Cooper Manufacturing Co.'s machinery and new machines; nainsook underwear added to mill's product.

Bennington. Bottum & Terrance Co.; this plant has more than doubled its equipment during past year.

West Virginia, Martinsburg. Interwoven Mills; three story brick addition to cost $30,000 started.

Wisconsin, Kenosha. The Cooper Underwear Co.; new five story addition; capacity plant increased; new power plant installed; opened new service branch in Seattle, Wash.

Janesville. Lewis Knitting Co.; men's underwear; added 12 knitting machines.

Milwaukee. Holeproof Hosiery Co.; Hosiery; new six story building 80 x 100 ft., and a one story addition 70 x 100 reinforced concrete; sprinkler system, electrical apparatus installed; capital stock increased to $1,000,000.

Milwaukee. Milwaukee Hosiery Co.; capital stock increased from $75,000 to $150,000; to increase equipment.

Milwaukee. National Knitting Co.; built new dye house, 48 x 196; equipped with Permutit water softener (100,000 gal. daily) and installed 8 Klauder-Weldon dyeing machines.

Milwaukee. Novelty Knitting Mills; capital increased from $15,000 to $40,000.

Milwaukee. Phoenix Knitting Works, Inc.; new building, 120 x 200 ft. to be erected, seven stories.

Two Rivers. Hand Knit Hosiery Co.; plant greatly increased; including dyeing department; added 1 set cards; 240 cotton spindles for manufacture yarns; increased equipment to 75 knitting machines; 20 sewing machines.

Waupun. Paramount Knitting Co.; (Chicago); installed dye and finishing plant in mill here.

Canada, Ontario, Hamilton. Chipman-Holton Knitting Co., Ltd.; increased capital to $100,000; erected new cotton spinning mill.

Kincardine. Circle-Bar Knitting Co., Ltd.; addition; equipment increased 40 per cent.

Lennoxville. Johnson & Shardlow; addition; equipped for manufacturing cashmere and silk hosiery and increasing output to 500 dozen worsted half hose per week.

Mitchell. A. Burritt & Co.; new knitting mill, 60 x 163 ft., three stories high.

MISCELLANEOUS

Massachusetts, Chelsea. Walker Bros. Dyeing & Bleaching Co.; added extra story to gray room and addition 20 x 40 ft. to packing room.

Fall River. Fall River Bleachery; 82 x 200 ft. addition to No. 1 plant to be used as finishing room.

Hopkinton. Moistite Mfg. Co.; purchased building and installed three carloads of machinery.

Mansfield. Mansfield Bleachery; additional storehouse, 200 x 50 ft., three stories high.

New Bedford. Hill & Cutler; Cleaners and Sorters of Cotton Waste; 120 x 80 addition, two stories high; also 35 x 50 ft., one story building for sterilization.

North Dighton. Mount Hope Finishing Co.; new mill, 175 x 350 ft., one story high.

New Hampshire, Milford. Milford Mfg. Co.; linen, jute and union canvas; 120 x 140 ft. addition, two stories high; 100 new looms.

New Jersey, Bridgeton. Martin Dyeing & Finishing Co.; addition 150 x 250 ft.; capacity increased to 40 tons a day.

Camden. Eavenson & Levering, Inc.; wool Scourers and Combers; three story brick addition to carbonizing plant, 80 x 120 ft. erected.

Millville. Millville Manufacturing Co.; erected large bleach and dye works.

Oxford Furnace. Oxford Dye Works; addition 100 x 47 ft.

Trenton. Scientific Textile Co.; branch plant at Morrisville, N. J.; 5,000 spindles.

New York, Newburgh. Newburgh Bleachery; addition for tenter frames and calenders; also new boiler house of 3,200 h.p. capacity.

Pennsylvania, Allentown. Allentown Silk Dyeing Works; 417-39 Sumner avenue; new addition for piece dyeing dept.

Allentown. Lehigh Bleaching & Dyeing Co., Inc.; addition built to plant; capacity increased to 6,000 lbs. finished cotton piece goods per day and 1,500 lbs. hosiery and yarn per day.

Allentown. Lehigh Silk Dyeing Co.; added machinery and equipment for silk piece goods dyeing and finishing; erected new brick addition, 80 x 186 ft., one story.

Philadelphia. Roger & Crawford, Ontario and Janney Sts.; Mercerizers' and Dyers' Cotton Yarns; installed bleachery dept. for plant and for the trade; also erected a new one-story brick storehouse, 106 x 30 ft.

Philadelphia. Edgewater Finishing Co.; 4080 Frankford avenue; erected new four story factory building.

Philadelphia. Frankford Winding Co. (Frankford), 1543 Ruan St.; Quillers and Coners all kinds yarns; took over an additional floor and installed new machinery; doubled former output.

Philadelphia. The General Processing Co.; Trenton avenue and Westmoreland street; erected new dye house, 55 x 124 ft., replacing one destroyed by fire; also made alterations to plant at Collins and Allegheny avenues.

Philadelphia. The Hellwig Silk Dyeing Co., 92 Buttonwood street; erected new storage house, 100 x 280 ft., one story, brick.

Philadelphia. Schwarzwaelder Co.; plant removed from 305 Cherry street to new four story building, 60 x 80 ft., erected at 1017 Wood street.

Philadelphia. The Summerdale Dyeing, Printing & Finishing Co.; Mill and Race streets; erected new building, one story brick, for warehouse.

Philadelphia. Textile Service Co.; Hancock and Huntington streets; Bleaching, Dyeing and Winding; installed new skein mercerizing plant; capacity 2 tons a day.

Philadelphia. The Universal Dye Works; Tackawanna and Womrath streets; taken additional space in the building, installed machinery for dyeing skein yarns and increased capacity.

Spring City. Spring City Bleach Works; Cotton Knit Goods, Specialty; purchased four story building and other buildings giving total floor space 65,000 ft.; re-equipped and improved plant in general.

Rhode Island, Bellefont. Imperial Printing & Finishing Co.; bleach house, 43 x 81 ft.; packing room, 42 x 27 ft.; cost $80,000; two printing machines.

Pawtucket. Eagle Dye Works; erected 200 x 100 ft. addition, costing $50,000.

Pawtucket. Halliwell Co.; added sulphur dyeing machine, 3,600 lbs. capacity and skein dryer.

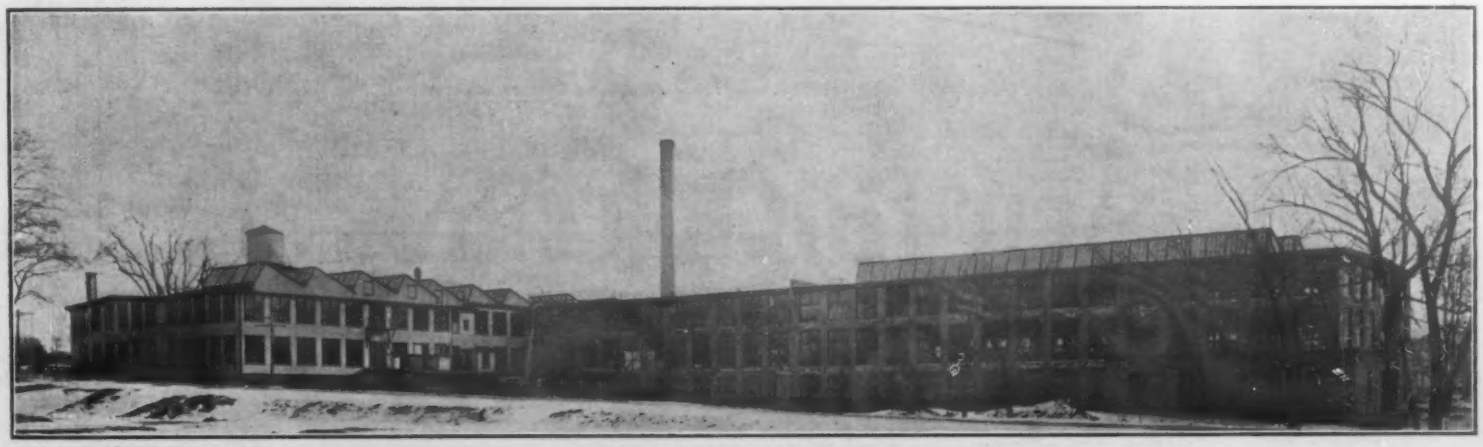
Pawtucket. Home Bleach & Dye Works; addition, 100 x 80 ft., three stories; dyeing, winding, drying equipment and mercerizing machines.

Pawtucket. McKenzie-McKay Co.; increased capital to $200,000; addition, 60 x 100 ft., three stories.

Providence. Gerald Cooper; Mercerizing, Dyeing and Bleaching of Skein Yarns; erected 100 x 100 ft. one story drying and storage building; installed dryer of 15,000 lbs. per day capacity.

Woonsocket. Rosemont Dyeing Co.; addition 40 x 150 ft.; for manufacturing and storage purposes.

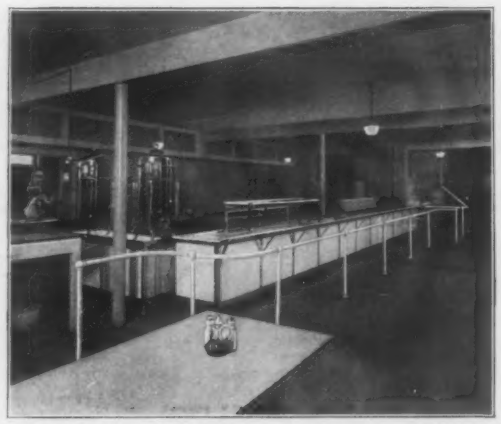
Tennessee, Chattanooga. Standard Processing Co.; increased capital to $400,000; addition 112 x 84 ft., one story 100 x 50 ft. warehouse addition; cost $25,000; new quilling machinery, winding apparatus, etc., costing $40,000; daily capacity increased to 13,000 lbs.



THREE STORY BRICK ADDITION TO HOME BLEACH & DYE WORKS, PAWTUCKET, R. I.

Lunch Rooms

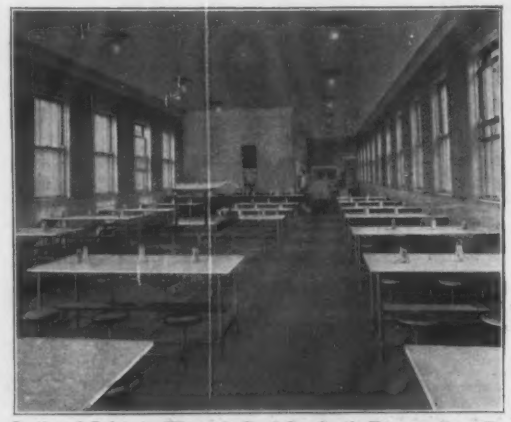
If you contemplate installing a lunch room in your factory, or if you already have one, it will pay you to become acquainted with the leading supply house in this and many other lines.



Section of Cafeteria, Reo Motor Co., Lansing, Mich., showing large service counter, our special all metal frame construction with white porcelain enameled steel German silver trimmed paneling; glass tops. Complete equipment placed in proper sequence, from the picking up of tray to final service of coffee.

Section of Cafeteria, A. Stein & Co. (Paris Garters) Chicago. Our special all glass sanitary counter on metal frame with enameled iron trimmings. The most successful all glass construction, originated for cafeteria use. Unique arrangement brings both sides together with a central checking point.

Section of Cafeteria, Ohio Malleable Iron Co., Columbus. Glass top tables and all glass "Pix" special construction counter harmonized for efficient, sanitary cafeteria service for employees. The glass top table is especially adapted to factory lunch room use.

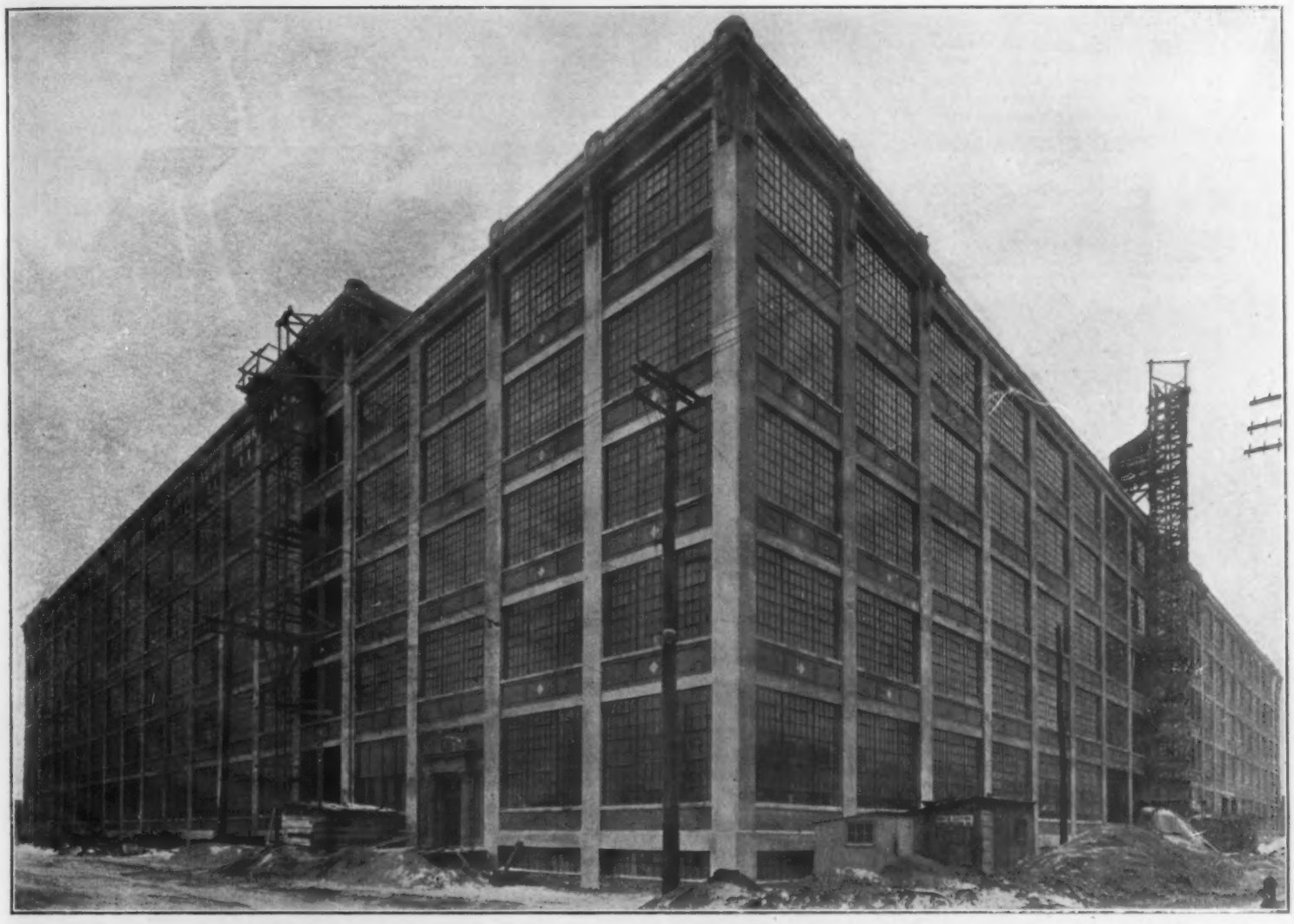


Section of Cafeteria, Wisconsin Steel Co., South Chicago. Specially designed tables with white glass tops, on pipe frame. Special stools that fold up under the table when not in use. A very satisfactory arrangement for factory lunch room use.

Information and Catalog on Request

ALBERT PICK & COMPANY

208-220 W. Randolph St. CHICAGO, ILLINOIS



THE NEW FLEISHER MILL, PHILADELPHIA, COVERS A SOLID BLOCK. IT IS IMPOSING AND IN SPITE OF ITS SIZE IS NOT "BULKY"

Plant of S. B. & B. W. Fleisher, Inc., Philadelphia

Solid Square of Industrial Construction of Surpassing Appearance and Detail of Arrangements

S. B. & B. W. FLEISHER, INC., Philadelphia, makers of the well-known brand of knitting yarns and braids, will soon occupy their new buildings, consolidating all processes under one roof and one supervision. These new buildings, just receiving the finishing touches, are located in the southern section of the city, between 25th and 26th streets, bordering Reed and Dickinson streets.

Modern textile plants of magnitude and of perfect appointment of details are by no means an exception to-day; nevertheless, the new Fleisher plant will probably for a long time to come represent the highest scale of industrial construction, not only for the textile trades but for other industries as well. The buildings will serve credit to the owners as well as to the engineers, William Steele & Sons Company, of Philadelphia.

MASSIVE BUT NOT "BULKY"

Philadelphia is known as the City of Factories, representing many excellent constructions, but it is doubtful if any plant in existence can surpass this new construction in style, utility, and careful planning of details. The buildings are massive but by no means bulky. The exterior, while ornamental, is simple; and the arrangements, with driveways, changes of height of buildings, and even in style of construction, makes the solid block smooth, pleasing in appearance, and yet in perfect harmony.

RIGID LINES OVERCOME

Rigid lines have been, so far, an objectionable feature of the full-block construction, and for the last few years a notable development has been made, through the efforts of mill engineers, to relieve such dreary appearance, yet not to sacrifice space or add unduly to the expense of construction.

We have come to realize that, besides well-planned details, the outside pleasing appearance has a great deal to do with the success of the mill, to obtain the most desirable working element. The new Fleisher plant, being located in a rather thickly populated section, will no doubt attract the attention and at the same time the desire of the workers to take advantage of the opportunity to secure employment in a building that from the outside promises the comfort of the workers. The driveways, besides separating the various units, provide the last link to the most important factor in textile mill construction—perfect daylight.

The Fleisher plants are divided into The brick work between the stories commencing in 25th street, extending there 90 feet, turning into Reed street, covering the whole frontage of 375 feet, and turning back into 26th street, with a 400-ft. frontage, and finally ending in Dickinson street, occupying 240 feet of this section. The main building, therefore, provides a total frontage of 1,105 feet, of which construction 390 feet are six stories high, while the rest are five stories. In Dickinson street, this main building is separated by a 25-ft. driveway from the dyehouse. Full sectional windows are provided at this end of the main building; thus daylight is supplied on practically four sides of the wing.

The dyehouse is two stories high, having 110-ft. frontage on Dickinson street, and continues into 25th street with 140-ft. front, adjoining the power house. The power house occupies 115-ft. front, separated from the main building by another driveway of 25 feet.

INDIVIDUALITY AND CHARACTER

All buildings are of re-enforced concrete construction, with brick facings and sectional windows. To overcome the monotony of appearance of such a mammoth construction, a simple but effective decoration has been adopted. The brick work between the stories being of red brick, the monotony is offset in the middle by an ornament of a simple diamond design of light color. Throughout the building the same decoration has been adopted on large surface side walls, visibly on the dyehouse and also at the end of the main building. Cornices of the main construction have been treated with the modified Grecian frieze of a band motif running throughout horizontally, while at the window distances the tall appearance of the building is offset by a vertical frieze of harmonious construction. These decorations are simple but give such individuality of character to the building that it is worth while to consider whether the small additional expense calling for such treatment of industrial constructions would not be worth while if universally adopted.

IMPROVEMENTS IN EXTERIOR

The main entrance is on Reed street and the portico carries the same motif as the cornices, supported by two Ionic columns.

The exterior of the new Fleisher Mills shows a very decided improvement over other similar constructions, and it proves definitely that a concrete construction must not necessarily lack pleasing appearance nor that an industrial building must be of necessity of the plain box construction, but is capable of artistic treatment without becoming ornamental.

Puts to Rout the Greatest Enemy of the Mill—POOR LIGHT

In our country's fight for greater production, it's the patriotic duty of textile industrial soldiers to raise the "standard" of efficiency and put to rout that greatest enemy of mill efficiency—poor light. Dark walls and ceilings work treachery in your mill—through mistakes, accidents, defective eyesight and health, and a proven slowing up in production.

The mill whose walls and ceilings are "Dixielited" has mobilized every light reserve possible, fortified itself and its employees against the dangers of gloomy surroundings and incited to action the productive power of every man and machine.

Let Dixielite spread pure-white and permanent light over the walls and ceilings of your mill—walls that take the daylight or artificial light, magnify and reflect it to every part of the room and spread greater production and better results.

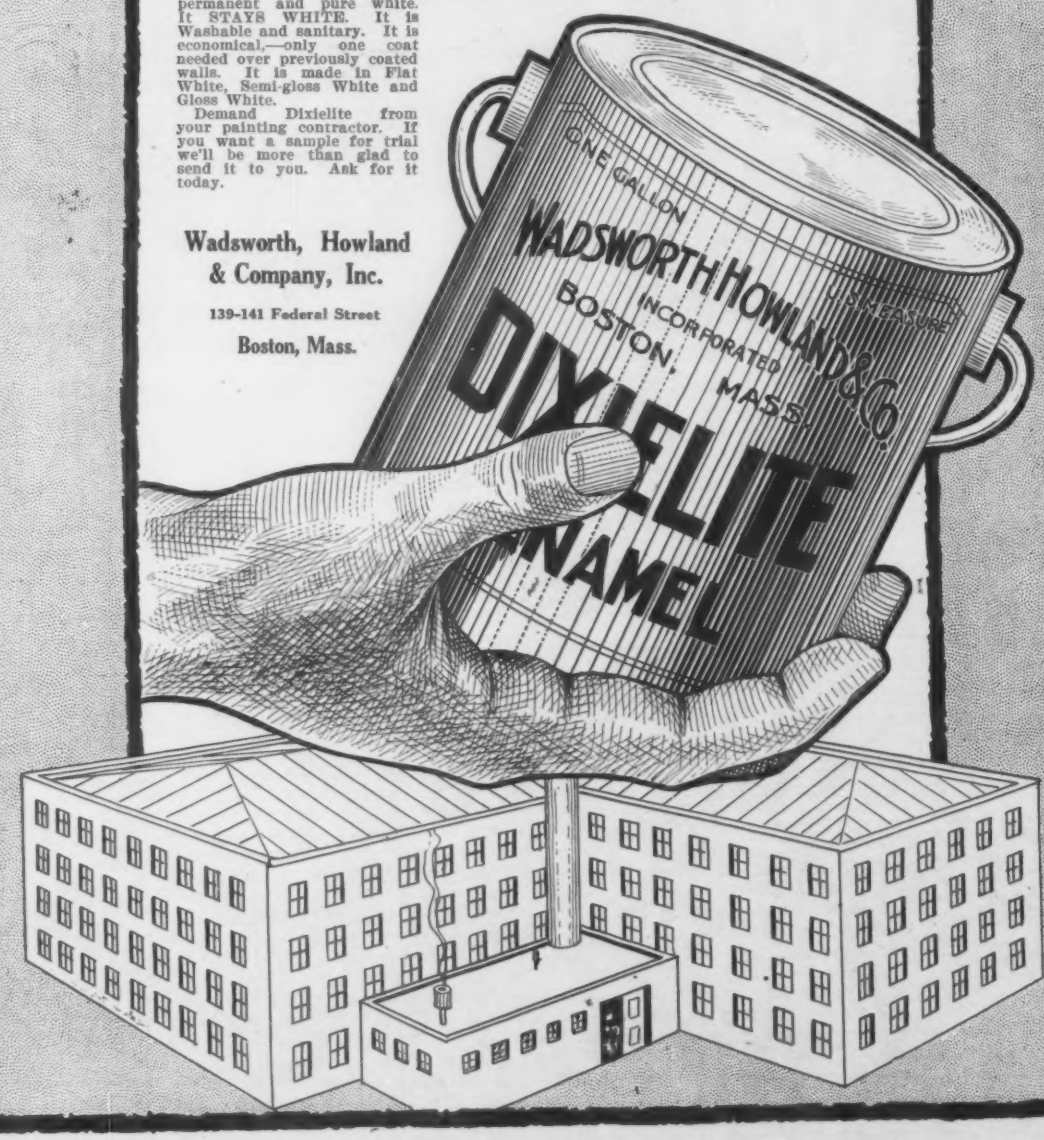
Dixielite is an absolutely permanent and pure white. It STAYS WHITE. It is Washable and sanitary. It is economical,—only one coat needed over previously coated walls. It is made in Flat White, Semi-gloss White and Gloss White.

Demand Dixielite from your painting contractor. If you want a sample for trial we'll be more than glad to send it to you. Ask for it today.

Wadsworth, Howland & Company, Inc.

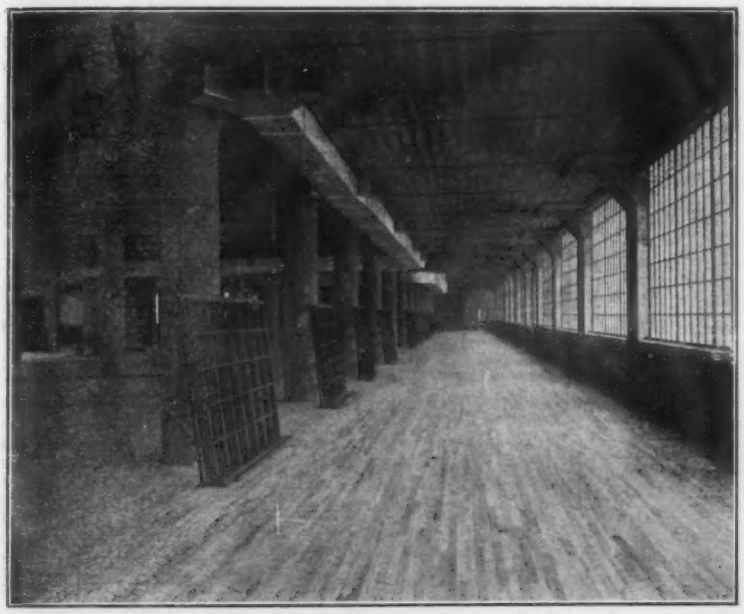
139-141 Federal Street

Boston, Mass.



Another very fortunate solution is the treatment of the power house. This is an independent construction but a continuation of the same frontage, and, while it lacks ornamental motifs, its simplicity adds to the effective treatment of the main building.

This is a standard power house construction of brick, with large doors for coal unloading, sectional windows, and high monitor. So much about the outside appearance of this new industrial palace.



LIGHT, PLENTY OF LIGHT, IS A FEATURE OF THE NEW FLEISHER MILL

WHOLE PROBLEM STUDIED

It will be interesting to know that before the final plans were prepared the mill management, as well as the architects, made careful studies of the requirements of the various departments in regard to light, heat, location, vibration, and finally the whole issue crystallized into two main issues; sufficient light and proper despatching facilities.

The question of vibration was not an important factor, nor the load distribution, since on standard concrete constructions engineers have a sufficiently broad experience by this time to have the various requirement of textile industry standardized.

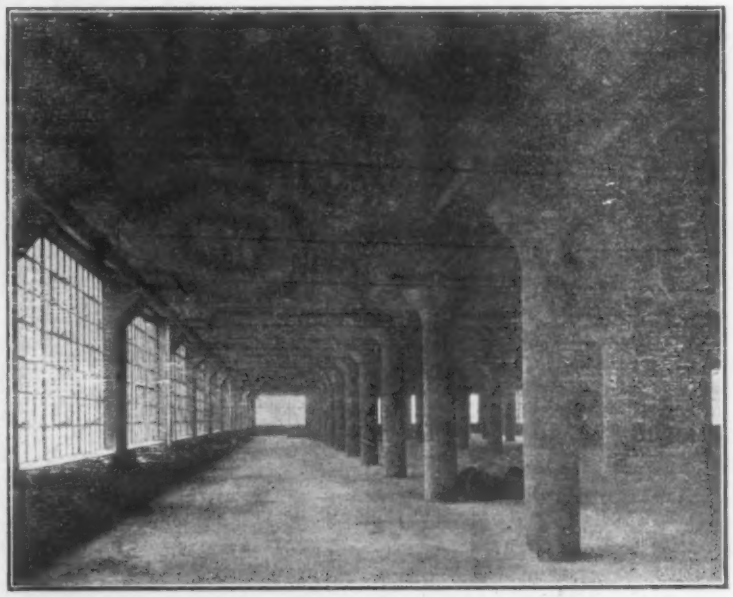
For the first part of the problem, besides the sectional windows, the flat slab construction was adopted, permitting such windows to be extended to the ceiling and providing perfect overhead daylight, and to prevent the glare, ribbed glass has been used throughout the mill.

SOLUTION OF DESPATCHING

The solution of the despatching problem has many unique features. The factory offices in this instance departed from the conventional first floor location, and are located on the roof of the new mill, away from noise and where good light is assured. They occupy what might be called the sixth floor of the main building. With the exception of the offices of the foremen, all others will be concentrated on this roof.

The mill expects to employ over one thousand workers, and passenger elevators will be installed in sufficient number to take care of the employes during morning, noon and evening rush hours. These passenger elevators all open into a hall which will house the locker room, comfort arrangements, and "First-Aid" room, for both male and female employes.

On the sixth floor, besides the offices, the employes' dining room, occupying a space of 320 x 70 feet, and accommodating 1,000 employes, a perfectly appointed hospital with constant nurse attendant, and a recreation room of 80 x 200 feet will also be located, thus making provision for the welfare problem of the mill. This new plant will draw many of its employes from the surrounding neighborhood and the mill expects to offer, besides comfortable working conditions, opportunities of self-improvement and social life. The character and intensity of this work will be shaped after the mill is in full operation.



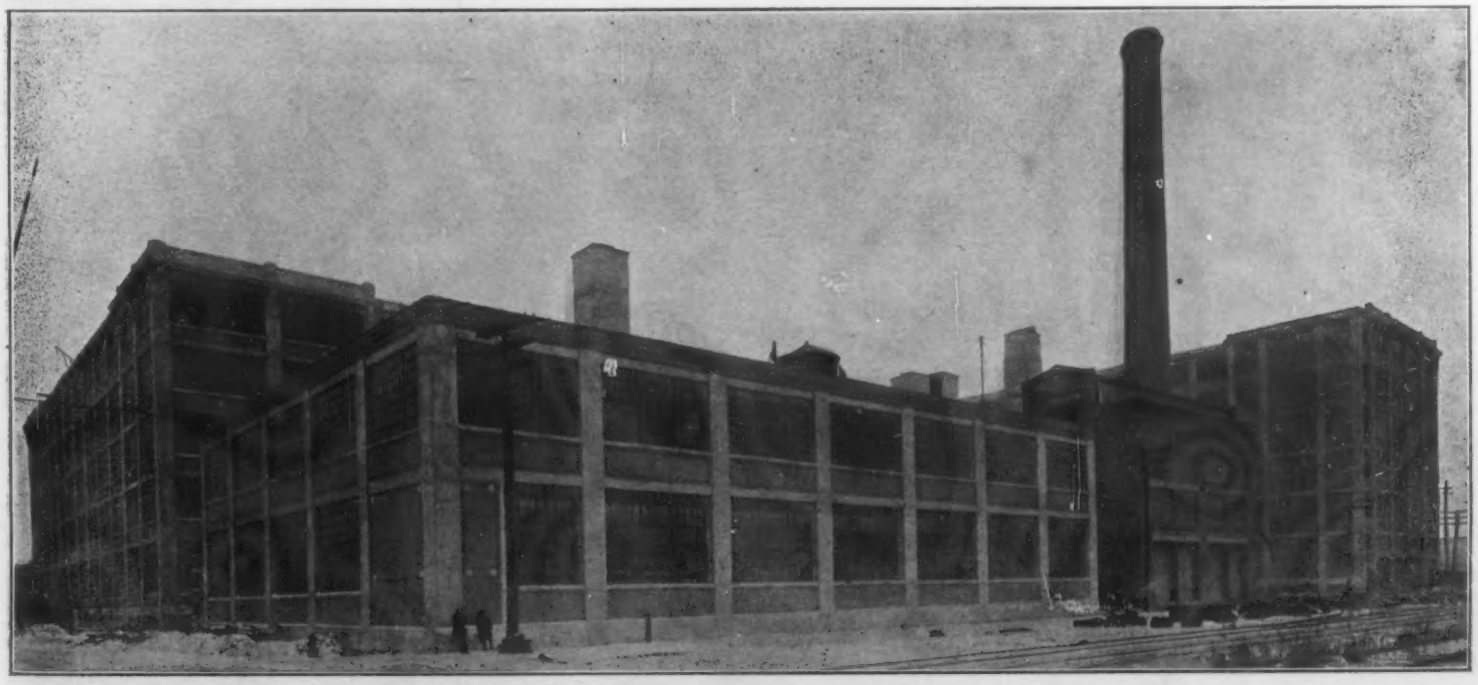
AN INTERIOR VIEW IN NEW FLEISHER MILL

CHUTES AND CONVEYORS

Another feature worthy of attention is the provision made for the elimination of labor, in handling, wherever possible. For moving materials, besides the numerous freight elevators, chutes and conveyors will be provided. This safe and cheap means of transportation which up to the present time has found only a limited use in textile mills, is gradually extending in service. When unskilled labor forms a very considerable expense and a constant problem of the management, this effective and labor-saving method of transportation should have a greater application.

At the new Fleisher plant, all transportation of wool to the washers, to the dyehouse and storage bins, will be carried on either by chutes or conveyors. The management hopes to extend this service to other departments after the present installation is in working condition.

For fire protection, besides the sprinkler system, all steel doors and roll-steel sashes have been installed throughout the plant. Roll-steel sash, while more expensive than the ordinary kind, has many advantages worthy of consideration. Its handling is more con-



THE NEW FLEISHER PLANT, TWENTY-FIFTH STREET FRONT; DYEHOUSE, POWER PLANT AND MAIN MILL IN BACKGROUND

WHARVES
TRESTLES
COAL HOISTING TOWERS
TIMBER COAL POCKETS
CONCRETE COAL POCKETS

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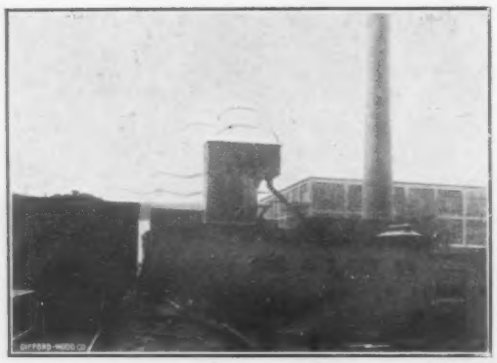
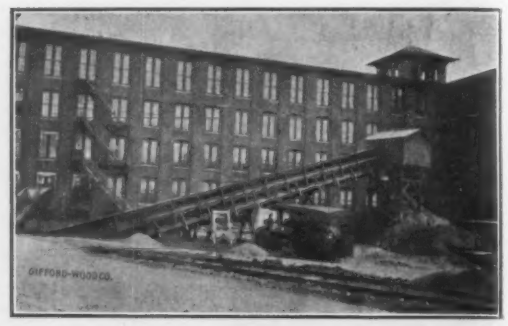
COAL HANDLING *and* STORAGE PLANTS *for* TEXTILE MILLS

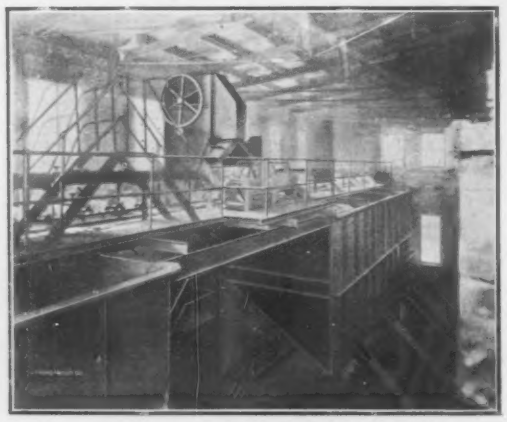


Power House Equipment. GERMANIA MILLS, Holyoke, Mass. Track hopper, reciprocating feeder, inclined bucket elevator, with distributing spout arranged to swing and feed through roof openings to storage.

Power House Equipment. F. C. HUYCK & SON, Albany, N. Y. In these days of high price and shortage of coal when embargoes are the rule, soft coal handling and storage has become the problem uppermost in the mind of the power plant superintendent. The above photo shows how one plant has solved their problem.



Track Hopper and inclined flight conveyor for yard storage.



Elevated bunker fed by vertical bucket elevator and two distributing flight conveyors. Coal drawn directly from bunkers to automatic stokers of boilers.

Yard Storage With Vertical Elevator. HELLER BROS., Newark, N. J. Double chain continuous bucket elevator with reciprocating feeder for soft coal for boiler house.

We do the engineering, furnish the plans and specifications, furnish and erect the machinery and all other materials and complete the plant ready for use.

Everything complete under one contract with an experienced Engineering and Construction Organization specializing in the design and erection of coal handling and storage plants.

Efficiency and economy in first cost, operation and maintenance.

High wages and scarcity of labor demand mechanical facilities for handling and storing coal.

We design and construct in timber, steel or concrete.

Drop us a line and we will send a representative.

THE COALING PLANT CONSTRUCTION COMPANY
53 STATE STREET, BOSTON, MASS.

venient, quicker, and insures the proper protection. Its safety does not depend on locks or latches which usually in time get out of order and become insecure.

For fire exits the Philadelphia fire escapes have been adopted throughout the mill. There is no other construction which will approach in safety, convenience, and appearance this style of construction. The fire escapes, while entirely separated from the main construction by fire walls, have an open frontage which prevents the funnel-forming danger, and solid cement stairways, wide enough to accommodate six persons at one time.

The narrow, frail, overhanging steel fire escapes stand no comparison with this installation, and one wonders why this method has not found a more universal use. It is a question how in case of fire the overhanging steel fire escape is expected to deliver safely hundreds of panic-stricken women down these narrow, rickety constructions. Why this Philadelphia system of fire escapes has not found a greater application in mill safety construction than it has today is a question worth asking.

Double-winged steel doors, that give way to the slightest pressure, but close automatically after this pressure is released, are usually installed with this system, and according to tests made by several safety engineers, a mill can be emptied of its personnel in one-fourth the time taken by the ordinary fire escape arrangements.

HEATING AND AIR MOISTENING

The heating of the Fleisher mill will be done by direct and indirect methods. Four air conditioners are installed throughout the main plant, and the proper temperature and humidity regulated at all seasons.

The dyehouse will be connected with the main building by the chute and conveyor system, and also through a connecting bridge, and while at present it is a two-story building, provisions have been made for an additional floor which may be put up without the slightest interference with the work of the department. The dyehouse will have every modern improvement known to this branch of the industry. The floors are all cement, slanted, and provided with overflow trenches. To make the place entirely fog-free, a central exhaust system has been installed in the basement of the mill, with a powerful fan

Throughout the mill all the machinery will be driven by electric power, generated in their own power house, and wherever possible the individual drive has been adopted. The wire lines are all buried in the ceiling. For artificial illumination individual drop lights are installed.

ARRANGEMENT OF DEPARTMENTS

The arrangement of the departments in relation to each other will also differ in many ways from the conventional methods. The wool sorting will be done on the fifth floor, and the wool dispatched through chutes to the first floor, where the washers and driers are located; then dispatched to the dyehouse through conveyors and the dyed stock sent to the cards or to the reserve bins through a blower system.

Carding, combing and spinning departments will occupy the third and fourth floors of the building.

The shipping department will be located on the second floor. An elevated railroad extension is contemplated for the near future to the second floor level, making the direct loading of shipments a feature, and at the same time a considerable cut in handling expense. The basement of the main mill will be used as a store room and conditioning department. The chemicals and sundry other materials will be stored in the basement of the dyehouse.

Machinery is already being installed in this new plant, and it is expected that by the end of January the greater part will be in full operation. The old plant will be discontinued, and all operations concentrated in the new location.

S. B. & B. W. Fleisher, Inc., feel that they have taken advantage of every improvement that will for a long time to come insure not only efficient production methods and convenience to the workers, and also have contributed a new example to modern mill construction, a duplication of which we hope to find in many future textile mill constructions.

New Mills of Black Cat Textiles Company

Interesting Plants at Bennington, Vt.; Sheboygan, Wis., and Harvard, Ill.

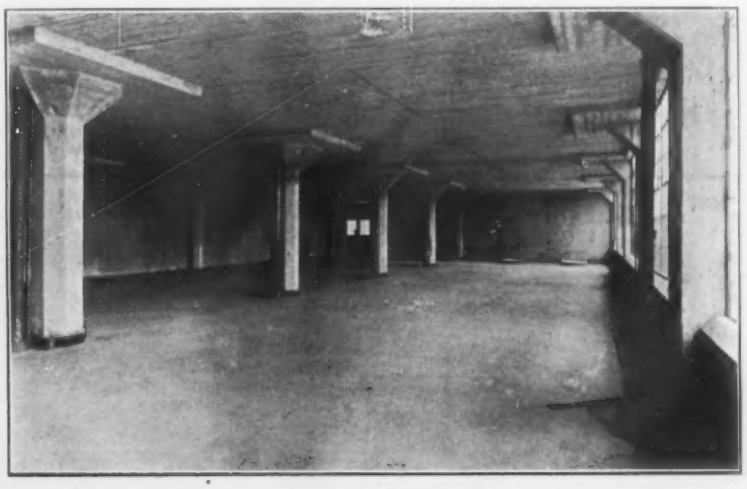
THE new plant of the Black Cat Textiles Company at Bennington, Vt., presents a number of interesting features which are shown by the accompanying photographs. The plans were worked out after a very careful study by the owners and the engineers, in an attempt to produce a plant having the most economical and efficient arrangement possible in an underwear plant of this size.

The mill was constructed to provide improved and enlarged facilities for the manufacture of underwear by this company, who purchased the Cooper Manufacturing Company's plant at Bennington some time ago, and the entire plant will soon be moved into the new mill.

FLAT SLAB TYPE CONCRETE

The new building is of reinforced concrete, 85 feet wide, 286 feet long and five stories in height. It is provided for future extension at both ends, and the necessary land for this purpose is already owned by the company.

The floor bays are unusually large for this type of construction, being 22 feet by 27 feet 6 inches. Typical story heights are 14 feet from finished floor to finished floor, but the height of the first story, which is used for storage and packing (except three bays occupied by offices) is 13 feet.



INTERIOR VIEW, BLEACHING AND WASHING ROOM ON FOURTH FLOOR OF BENNINGTON PLANT OF BLACK CAT TEXTILES CO. FLOOR SURFACE IS OF ASPHALT; ROOM PITCHES FROM CENTER TO EACH SIDE AS MAY BE SEEN IN PICTURE. GUTTERS FOR DRAINAGE AT EITHER SIDE OF ROOM ARE ALSO SHOWN. WORKING PLATFORMS AROUND MACHINES ARE TO BE ERECTED, RUNNING FULL LENGTH ON EITHER SIDE OF CENTER OF ROOM

The flat slap type of concrete construction was selected because of the smooth ceilings and improved daylight conditions secured. All floors throughout are of maple, the flooring being laid diagonally, as will be seen by the photographs.

About 65 per cent of wall area is taken up by windows. The sashes are of steel and the upper two-thirds in each story are glazed with ribbed glass penticor pattern, and the bottom one-third with clear glass. Along the south side of the building the steel sash ventilators are pivoted 4 inches from the top to swing out, thus presenting no obstructions to the use of curtains when the ventilators are open.

The curtain walls are constructed of dark red brick and they, in contrast with the uniformly light color obtained on the exterior concrete surfaces, and the dark green paint on steel sash, give the building a very clean cut and handsome appearance. At each end of the structure is a built-in tower, each tower encloses one flight of stairs and one elevator shaft.

Toilets, two to a floor, are enclosed by 4-inch hollow the partitions, plastered. Sanitary fixtures of the best grade have been installed and floor drains are provided so it will be possible to flush these rooms, the floors

INTERIOR VIEW, FIFTH FLOOR OF BENNINGTON PLANT OF BLACK CAT TEXTILES CO., TO BE USED FOR KNITTING AND WINDING

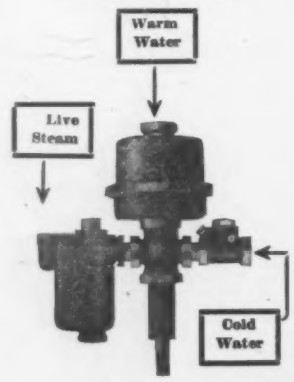
VIEW OF DRY ROOM ON FOURTH FLOOR OF BENNINGTON PLANT OF BLACK CAT TEXTILES CO., SHOWING HOLES THROUGH FLOOR FOR PIPE DRYERS

Automatic Control of Liquid and Air Temperatures

UNIFORM temperature is a recognized essential in textile manufacturing. Without it material, labor, time, and profits are lost.

Manual control of temperatures is inaccurate, expensive and unsatisfactory. Real efficiency demands automatic control. The Powers Regulators —entirely self-contained—require no air or water pressure for operation, and are absolutely dependable.

Do Your Men Ever Get Scalded?



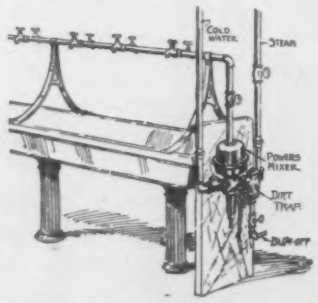
A scalded man costs money—but your men must have warm water for wash sinks, showers, etc. Avoid *all risk of scalding* by using the Powers Thermostatic Steam and Water Mixer illustrated above. It is the cheapest possible equipment for supplying warm water for workmen's wash sinks, shower baths, etc.

It delivers warm water when wanted, *instantly*, without waste, or danger of scalding.

Great economy of operation.

There is a Powers Regulator for almost every condition involving control of liquid or air temperatures.

Ask for Bulletin 137.



Typical Installation in Workmen's Wash Sinks.

Attached to any steam heated kettle, vat, tank, tub, etc., will positively and accurately control the temperature of the liquid therein.

Applied to dry rooms, ovens, etc., will give perfect regulation of air temperatures.

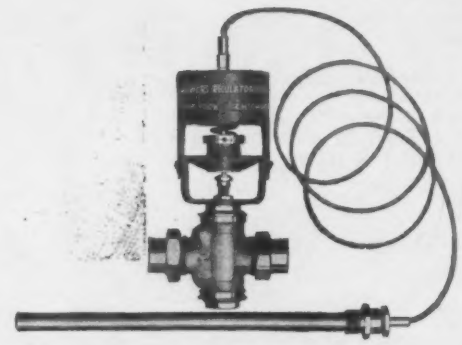
For mixing hot and cold water to give any desired temperature they are effective and reliable. Wide range of control, instantly adjusted to any desired point.

Adaptable to almost any condition, and adjustable to any required range of operation.

The use of the Powers Regulator will prevent variations in shades, weights, sizing, mercerization, tensile strength, and any other sub-standards that result from improperly controlled heat at some point in the process of manufacture.

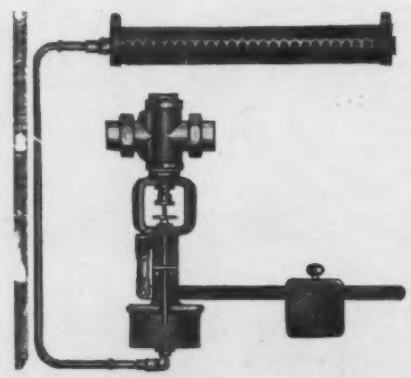
Put *any* temperature regulation problem up to us.

Ask for Bulletin 138.



POWERS REGULATOR NO. 11.

This regulator is designed primarily for controlling the water temperature in steam heated tanks. It is suitable for use in any kind of liquid—for dyeing, boiling, cooking, etc., in open or closed tanks, and can be adapted to meet any manufacturing condition.



POWERS REGULATOR NO. 15.

This regulator is adapted for use wherever air or vapor temperature is to be controlled. The flexible tube may be any length desired, so the thermostatic bulb may be placed to the best advantage.

Every Powers Regulator is trustworthy —it's on the job all the time and never gets tired.

The Powers Regulator Co.

Specialists in Automatic Heat Control

968 Architects' Bldg. NEW YORK | **2157 Mallers Bldg. CHICAGO** | **379 The Federal St. Bldg BOSTON**

CANADIAN POWERS REGULATOR CO., Ltd., Toronto, Ont.

and walls of which are finished with cement, with a hose.

The site adjoins that of a 7-set woolen mill, already owned and operated by the company, for producing woolen yarns. A bridge at the second floor level connects the old woolen mill with the new knitting mill.

installing a generator for emergency use.

ROUTING OF MATERIALS

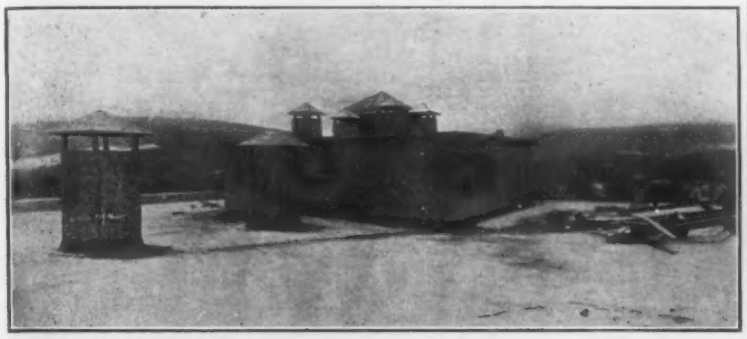
The arrangement of departments and the routing of materials through the mill is of particular interest, and represents what might be termed as a "Gravity Routing," because of the fact

The winding and knitting room will be equipped with the Cramer system of humidifiers and with automatic temperature and humidity control. Knitting machines and winders will be arranged with working alleys running crosswise of the mill, in order that machines may obstruct the light as little as possible.

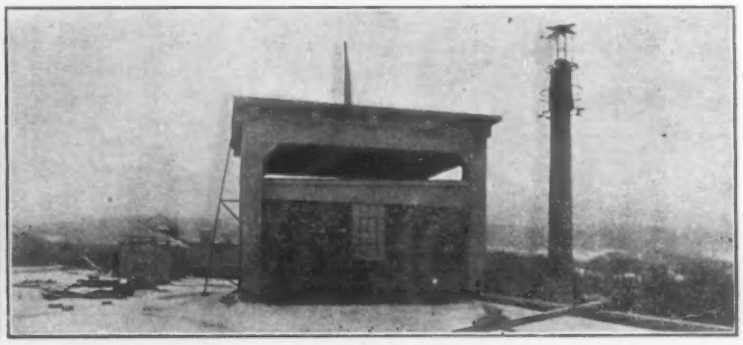
goods directly to the fourth floor where the washing and bleaching room is located. Dryers and cutting department are also on fourth floor.

WASHING AND BLEACHING ROOM ON FOURTH FLOOR

The plan of locating the washing and bleaching room on the fourth floor is



VIEW ON ROOF OF BENNINGTON PLANT OF BLACK CAT TEXTILES CO., SHOWING TOP OF VENTILATING STACKS FROM WASHING ROOM AND BLEACHERY IN FOREGROUND, AND SULPHUR BLEACH HOUSE IN BACKGROUND. ELEVATOR FROM LOWER FLOORS CONNECTS DIRECTLY WITH SULPHUR BLEACH HOUSE. CONCRETE FIRE BOX MAY BE SEEN ON THE NEAR SIDE OF THE BLEACH HOUSE



VIEW ON ROOF SHOWING ELEVATED STRUCTURE TO SUPPORT TANK, AND BELOW THIS THE TANK HOUSE WHICH WILL CONTAIN BOTH HOT AND COLD WATER STORAGE TANKS FOR SUPPLY OF WATER TO DYEHOUSE. AT RIGHT MAY BE SEEN CONCRETE STACK OF POWER HOUSE

A separate building in the rear will contain boiler plant, power plant, water softeners, pumps, generators, etc. The new mill will be equipped with motor drives throughout, individual motors being used so far as possible. The winders and knitting machines will be operated by group motor drives. The company will not manufacture the current they will use regularly, but are

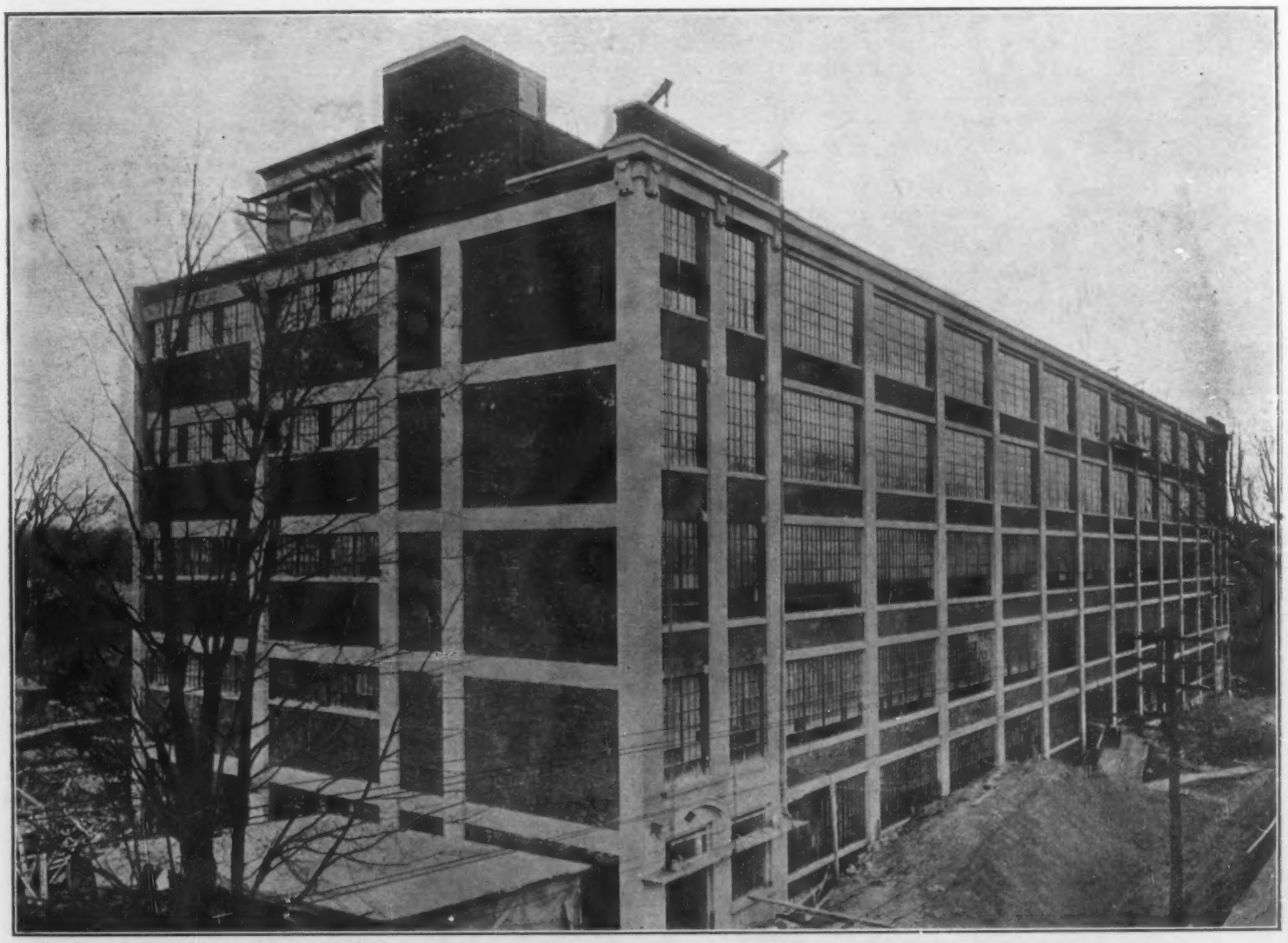
that work starts on the top floor and works down by progressive stages to the ground floor where the storage of finished goods and shipping is located. The accompanying drawing shows this very clearly.

Yarn storage will be located in the top story for the present, although at a later date additional storage facilities for yarn will be provided.

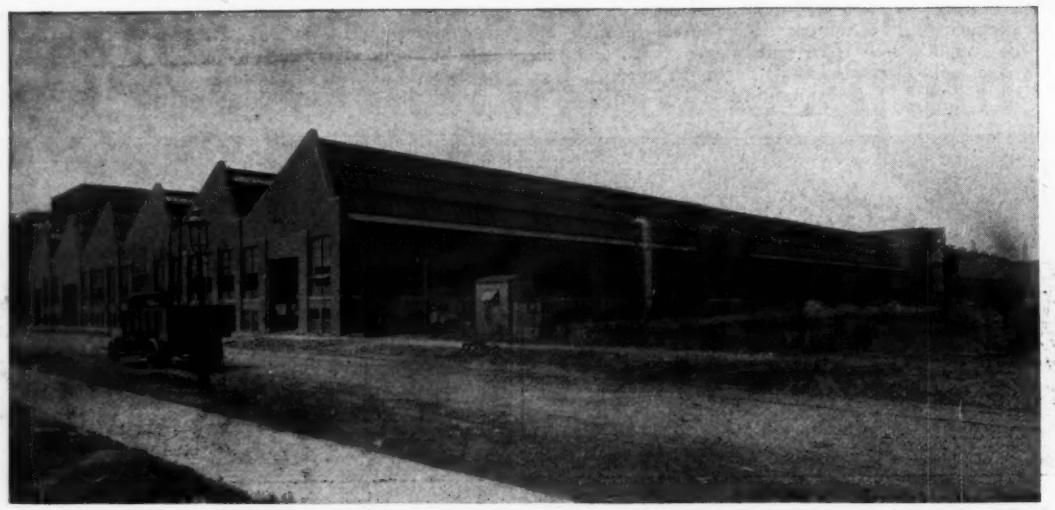
This arrangement of working alleys across the mill has been followed in machinery layouts wherever possible. Space in the center of the knitting room, as well as in other rooms, will be used for yarn racks and trucking alleys, the principle being followed of using the space furthest from windows for this purpose.

Holes through the floor in the knitting room will provide for dropping the

rather novel, but has been studied carefully and it is believed this arrangement will work out well in this particular case. This room has been provided with an asphalt floor to provide for waterproofing and drainage. Ventilation is taken care of by a system of vent stacks running up through the fifth floor and carried well above the roof. The heating of this room will be by means of a fan system, blowing a con-



NEW UNDERWEAR MILL OF BLACK CAT TEXTILES COMPANY, AT BENNINGTON, VT.



The White Motor Car Co., Cleveland — Owner's Plans

BOTH BUILT

by The Crowell-Lundoff-Little Co. Cleveland

THE erection of the two structures shown on this page illustrates the scope of an organization that has breadth and is thoroughly equipped in the departments of estimating, purchasing, traffic and construction.

In the course of our extensive experience we have erected a great many types of buildings, amounting to the investment of many millions of dollars—structures that will serve for many years, as achievements in commercial, industrial, educational and monumental building.

On Euclid Avenue, in Cleveland, can be seen mammoth department stores, banks and office buildings, of our construction. In Rochester, N. Y., we built an immense structure for the making of munitions; in Philadelphia, a group of buildings for a large well-known steel corporation; in Elyria, Ohio, an automobile building for the Willys-Overland Co.; and in numerous other cities we have erected factories, ship-building plants, theatres, bank buildings, warehouses, and other types of structures.

Our service includes every detail of building construction; purchasing of all materials, their delivery in proper sequence, assembling of men, general and competent supervision of construction, and the guarantee of delivery on schedule time. Whatever your building needs may be we can serve you with economy, speed and thoroughness.

Economy Factory Buildings

As a result of years of contact and experience with the requirements of many corporations we have developed a series of seven economy factory buildings designs. Each is different in style and purpose, and can be erected in a few weeks and later added to, as all are based on the unit system of construction.

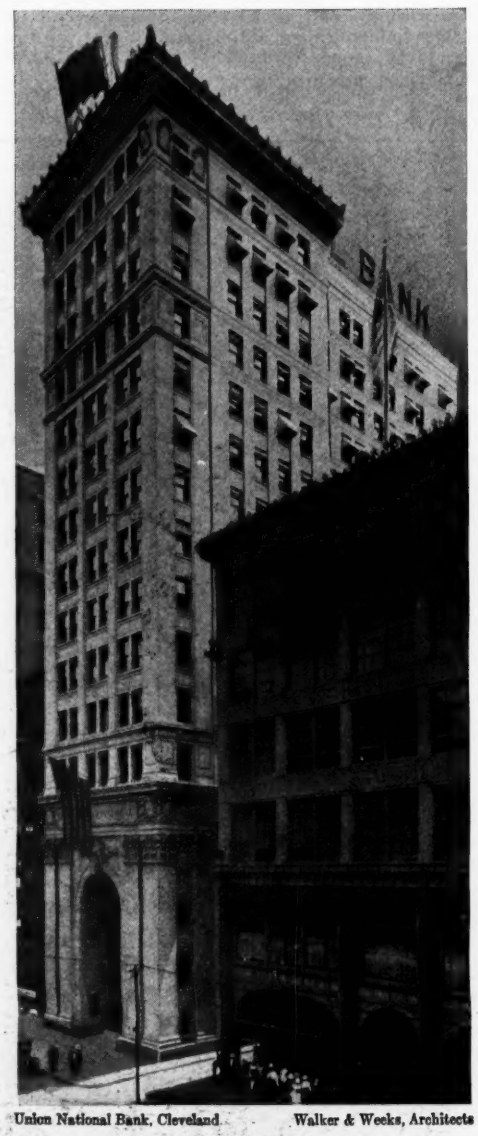
Our operations are not limited in size or type of building, any structure from a small machine shop to an entire manufacturing plant is handled with equal facility by our several departments working as a unit.

Write, wire or telephone and one of our Contracting Engineers will get in immediate contact with you.

Ask for our book, "The Crowell-Lundoff-Little Co. Building Construction." It is valuable and interesting evidence of what we have done, and gives a good impression of the capabilities of this organization.

Among our clients we include the following:

The Joseph & Feiss Co.	Cleveland, O.	Cleveland Museum of Art	Cleveland, O.
Standard Mfg. Co.	Cleveland, O.	Upson Nut Co.	Cleveland, O.
Willys-Overland Co.	Elyria, O.	Chandler Motor Car Co.	Cleveland, O.
American Ship Building Co.	Cleveland, O.	Symington-Anderson Co.	Rochester, N. Y.
Union National Bank	Cleveland, O.	Tioga Steel & Iron Co.	Philadelphia, Pa.
Second National Bank	Warren, O.	Hess Steel Corporation	Baltimore, Md.
Second National Bank	Wilmington, Del.	Stillman Theatre	Cleveland, O.
Cadillac Co.	Cleveland, O.	American Fork & Hoe Co.	Jackson, Mich.
Grasselli Chemical Co.	Cleveland, O.	Warner & Swasey Co.	Cleveland, O.
Jordan Motor Car Co.	Cleveland, O.	W. B. & A. R. R.	Baltimore, Md.
Ferro Machine & Foundry Co.	Cleveland, O.	B. F. Goodrich Co.	Akron, O.
Standard Parts Co.	Cleveland, O.	Cleveland Trust Co.	Cleveland, O.
Standard Oil Co.	Cleveland, O.	American Brake Shoe & Foundry Co.	Erie, Pa.



Union National Bank, Cleveland — Walker & Weeks, Architects

The Crowell-Lundoff-Little Co.

Nineteen-Fifty-Five
East Fifty-seventh Street

Cleveland

General Building Construction;
Industrial, Monumental;
Educational and Commercial

stant supply of warm, dry air into the room to absorb and replace the vapor from washing machines and bleaching vats.

A working platform of plank with open joints will be constructed to a height of about 3½ feet above the main floor, and will be carried around all machines and throughout the length of the room on either side, with a trucking alley down the center of the room at the main floor level.

The floor in this room is crowned at the center to a height of about 4 inches, and gutters are provided on either side with large outlets connecting directly to the drainage system. The asphalt floor is carried continuous through the gutters and turned up on the walls and columns to a height of 6 inches. A saddle is also constructed at each doorway opening into this room, so that water could stand to a height of at least 6 inches on this floor without damage.

KIERS LEVEL WITH FLOOR

The kiers are located at one end of the bleaching room and are set in the third story, or the one below the bleaching room. The tops of kiers come through holes in the fourth floor and set level with same. All loading and unloading of kiers is done directly in the bleaching room.

The dry room is located at one end of the fourth floor immediately adjoining the bleaching room, and holes through the floors with concrete curbs, as shown by photograph, have been constructed for the installation of the pipe dryers which will be used for part of the goods.

The enclosed type of dryers will be used for other goods. These dryers are also located on the fourth floor, together with the cutting department. From the cutting room, holes open directly through the floor to the finishing room on the third floor. The finishing room will be arranged with two rows of tables crosswise of the room and a wide trucking alley down the center. In this room all tables will be equipped with individual motors and chain drives. Wiring for these motors will run under the floor so that there is no exposed conduit.

General illumination only is provided in the finishing room, and each stitching machine will have an individual light on a flexible arm fixture. The interior of the building is painted with two coats of flat finish mill white paint and with a gray dado, five feet high around all walls and columns.

From the finishing room on the third floor, goods will be dropped through holes in the floor to the second floor for inspection, ironing, pressing and boxing. These departments occupy most of the second floor.

CONVEYING BY SPIRAL CHUTE

At one end of the second floor will be located a spiral chute, and finished goods will be carried by this chute to the first story where racks will be located for the storage of finished goods in boxes.

The entire first floor is occupied by this storage, together with a general receiving and stores department for miscellaneous supplies, and a small factory office. A shipping platform at one of the first story provides for loading the goods out. This same platform being located adjacent to the elevator, is also used for the receiving of cotton yarn, and a bridge entering the mill near this point on the second floor provides for the receiving of woolen yarn.

SULPHUR BLEACHING ON ROOF

The location of the sulphur bleach house on the roof is of interest. The elevator at end of mill nearest bleaching room is carried up to serve the main roof level, where a sulphur bleach house constructed entirely of wood has been built. The accompanying photograph shows this bleach house, together with concrete fire pot and vent stacks.

Another interesting feature is the location of storage tanks to provide hot and cold water for the bleaching room. These have been located in a tank house constructed above the main roof level and under the elevated platform or trestle which carries the sprinkler tank. The accompanying photograph shows this clearly, and in this house provisions have been made for the installation of two large tanks—one for hot water and the other for cold.

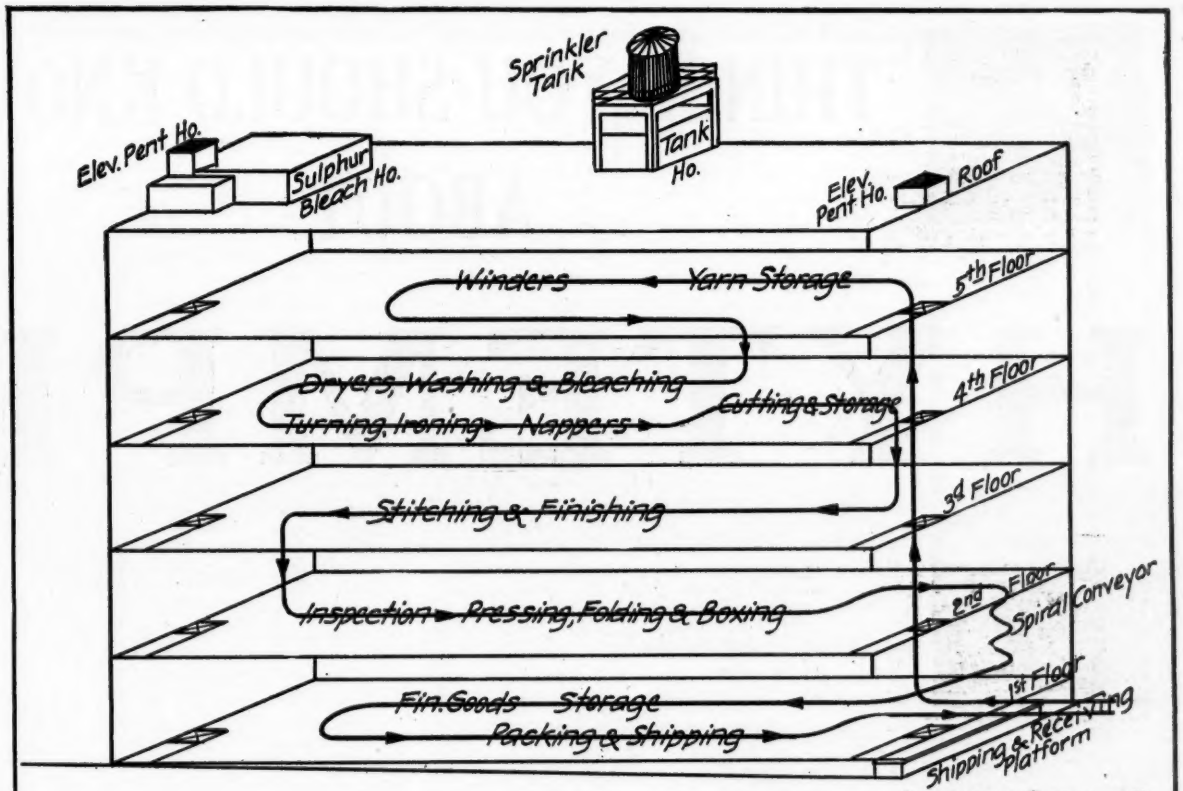
The cold water tank will be an open wood tank, and the hot water tank a closed steed tank, well insulated to retain the heat. The construction of this house is with tile walls and brick facing to prevent heat losses. The combined capacity of the two tanks will be about 15,000 gallons.

PROVISIONS FOR WELFARE

The welfare of employes has been kept in mind and provisions have been made for the most modern toilet and coat rooms. On the fifth floor a large room has been reserved for lunch rooms and rest room.

The toilet rooms are of generous size and are located in all cases at corners of the building, thus providing light on two sides. They are equipped with the most modern fixtures, including closets with flush valves, thus eliminating all tanks.

Enameled steel partitions are used for the compartments. Wash sinks have been provided in each toilet room, equipped with hot and cold water mixing valves. In accordance with modern practice these are so arranged that employes are obliged to wash in running water, there being no provisions for any other method. Immediately adjoining the toilet rooms on each floor, space has been provided for coat rooms.



ROUTING DIAGRAM, NEW UNDERWEAR MILL
BLACK CAT TEXTILES CO. BENNINGTON, VT.

A space 88 inches x 66 inches in size, on the top floor, will provide space for lunch room and rest room. This space communicates directly with the roof by a stairway, and the entire roof area surrounded by a high parapet wall will be available for the use of employes during the Summer.

Construction on the building was commenced in June and is substantially completed at the present time. The contractors are the Turner Construction Co., of Boston and New York City. The plant was designed, machinery layouts and handling worked out, and the installation supervised by the Chicago office of Lockwood, Greene & Co., engineers.

Sheboygan Plant of Black Cat Co.

Provision Has Been Made for Addition of Further Units

THE new plant of the Black Cat Textiles Company, at Sheboygan, Wis., was completed about April 1, 1917. This is operated as a branch of the main factory and is used for the knitting and looping of children's hose, the goods being finished at Kenosha for the present. Construction work was completed in about ninety days under difficult weather conditions, the thermometer ranging from zero to twenty degrees below zero during at least two months of the construction period.

The site is on Pennsylvania avenue, which is one of the principal streets, and the location is about in the center of the city of Sheboygan, which is a hustling city of 30,000 people, with wood working and furniture factories forming the principal industries of the town. The present building covers only a portion of the site, and in making the layout provision has been made for the addition of future units. The building is of reinforced concrete throughout, and is designed for the addition of two more stories at a later date.

The mill is 43 feet wide by 160 feet long, with a single row of columns down the center, spaced about 20 feet apart lengthwise of the building. Story heights are as follows from top to top of floors: Basement, 9 feet; first and second stories, each 13 feet.

GIVES MAXIMUM LIGHT

As will be seen by the interior photographs, the building is of flat slab construction, thus giving unbroken ceilings and the maximum light. Indirect lighting has been adopted for the knitting and looping departments, and the result has been more than satisfactory. All floor surfaces are of maple, and toilet rooms are provided with terrazzo floors, white enameled tile wainscot, and steel partitions.

The method adopted for supporting the shafting is of interest, as there was some question about whether the single thickness maple flooring nailed to sleepers imbedded in concrete floor would prove satisfactory. A base for shaft supports made up of 2-inch plank running the entire length of the shafting was provided, and this base was securely screwed down to the nailing strips carrying the maple floor. The shaft supports were then secured to this and the results were very satisfactory. This support is clearly shown in the interior photographs.

Electric power is purchased for plant operation, and a boiler plant in the basement provides for the heating.

The arrangement of the plant is as follows: A large, well lighted basement provides space for yarn storage and finished goods; the second floor is devoted to the ribbers and knitting machines, and the first floor to knitting, looping and inspection. All shafting is erected with Hyatt roller bearings.

An interesting feature of racks for

Bridge wall in boiler laid with Hytempite.

THINGS YOU SHOULD KNOW ABOUT

Setting arch in small furnace with Hytempite.

HYTEMPITE

Reg. U. S. Pat. Office

Forms in place, reverberatory smelting furnace, ready for lining.

Mixing Hytempite with old crushed fire brick for making rammed-in lining for smelting furnace.

Ramming-in lining, smelting furnace.

Crucible before repairing and surfacing with Hytempite.

Same crucibles after being repaired and resurfaced with Hytempite.

Relining gas producer with Hytempite and crushed old fire brick.

What is it?

HYTEMPITE is a scientifically compounded refractory plastic material for bonded fire brick and kindred uses.

What does it do?

HYTEMPITE forms a lasting union between the materials to be joined, sets at normal temperatures and retains its strength regardless of the heat it is subjected to up to about 3100° F. (1700° C.) or a temperature at which the best quality fire brick loses its strength and becomes soft.

Why is it better than fire clay?

HYTEMPITE is better than fire clay because fire clay and water has no binding strength, does not support the brick work or knit together the materials with which it is used, comes loose from constant expansion and contraction, disintegrates or falls out, forming crevices or cracks, and does not maintain a gas or air tight structure.

Does it depend on heat for a bond?

No, HYTEMPITE air sets at normal temperatures, making a wall of uniform strength throughout.

What proves its merit?

Over 75% of its sales are repeat orders.

Will it stop or prevent air and gas leaks?

Yes, HYTEMPITE will not only stop these leaks, but will withstand the expansion and contraction caused by heat without loosening.

What are some of its uses?

1. For laying fire brick and tile.
2. For tightening old walls and arches, sealing openings in new walls, stacks, etc., to make them airtight, lining doors, etc.
3. Hot patching in furnaces, gas retorts, etc.
4. Making special tile and shapes with crushed old fire brick or carborundum fire sand.
5. Making rammed-in linings with your crushed old fire brick or carborundum fire sand.
6. Bonding new courses or a veneer of fire brick to old walls.
7. Preventing leaks between bricks and iron work.
8. As a wash for surfacing brick work.
9. As a grout diluted or neat, according to requirements.
10. For lining ladles.
11. For patching or building up tuyeres, etc., etc.

Who makes HYTEMPITE?

An organization that has had over twenty years' experience in furnace design, construction and operation and which understands what is required of a furnace cement and stands back of HYTEMPITE, Furnishing Personal Service.

Pit crucible furnace before lining.

Form in place, partially lined.

Pit crucible furnace relined with Hytempite and carborundum rammed-in.

Door before being repaired with Hytempite. Bricks falling out.

Furnace door repaired with Hytempite.

Ramming lining in open flame melting furnace

SATISFIED USERS

ALLEN J. GRAHAM, PRESIDENT AND TREASURER
HAMLIN BEATTIE, SECRETARY

L. L. CLIFFORD, VICE PRESIDENT
M. E. SINCLAIR, ASSISTANT TREASURER

ENOREE MILLS
ENOREE, S. C.

EXECUTIVE OFFICE
GREENVILLE, S. C.

ENOREE, S. C. Aug. 1, 1917.

Quigley Furnace Specialties Co.,
26 Cortlandt Street,
New York City.

Gentlemen:-

We have yours of July 20th, in regard to HYTEMPITE which you sold us some time ago. We are glad to say we find this material very satisfactory and when in the market again will be glad to let you hear from us.

Yours very truly,
ENOREE MILLS,

LLC/S.

OUR GREATEST ASSET

Quigley Furnace Specialties Co., 26 Cortlandt Street New York

holding the goods is indicated in one of the interior photographs, which shows that adjoining racks open on alternate sides. There is a single line of racks providing space for work on both sides of same.

CONDITIONS ATTRACT EMPLOYES

The new plant started operation early in April, and at the present time takes care of about 150 employes. It has been the aim of the Black Cat Textiles Company to provide the best possible working conditions for the employes at this plant.

At the time this new plant was projected, the Black Cat Textiles Company were renting space in Sheboygan and had about seventy-five employes. As there is quite a demand in Sheboygan for girls in a variety of other industries, it was felt that there was perhaps some question about the securing of a suitable supply of labor.

This new plant was worked out to provide a desirable place to work, and with this thought in mind the toilet rooms were equipped with white enameled ceilings and partitions, enameled tile walls and terrazzo floors.

The entire interior of the working rooms is flooded with sunlight at all times. Special care is taken to keep all floors and windows clean at all times, and a cheerful atmosphere fills the whole plant.

An interesting result has been that the number of employes has been increased from seventy-five to about one hundred and fifty with no trouble whatever, and a plentiful labor supply seems to be assured at all times.

The plant was designed and construction supervised by the Chicago office of Lockwood, Greene & Co., engineers.

HARVARD (ILL.) MILL

A new mill has been opened at Harvard, Ill., occupying floor space of about 30,000 square feet, which at present is employing about seventy-nine people, and where they expect to produce nothing but men's half hose. This mill has been in operation about sixty days, and up to the present time they have had more applications for employment than they can conveniently handle.

At the Sheboygan, Wis., mill they are producing only children's hosiery and employ about 250 operators. At the Bennington, Vt., mill they are manufacturing only the famous Cooper-Bennington spring needle line of underwear and use the well-known Cooper spring needle machines on all of this work.

Their production of hosiery in all the mills is 25,000 dozen daily, and their daily production of underwear at present is about 700 dozen daily, but this amount will be materially increased when they are able to operate at full capacity in the new mill.

Lewis Manufacturing Company

A GROUP of three modern buildings were added to the plan of the Lewis Manufacturing Co., in Walpole, Mass., this past year, comprising a new manufacturing building, a storehouse and a new bleachery building.

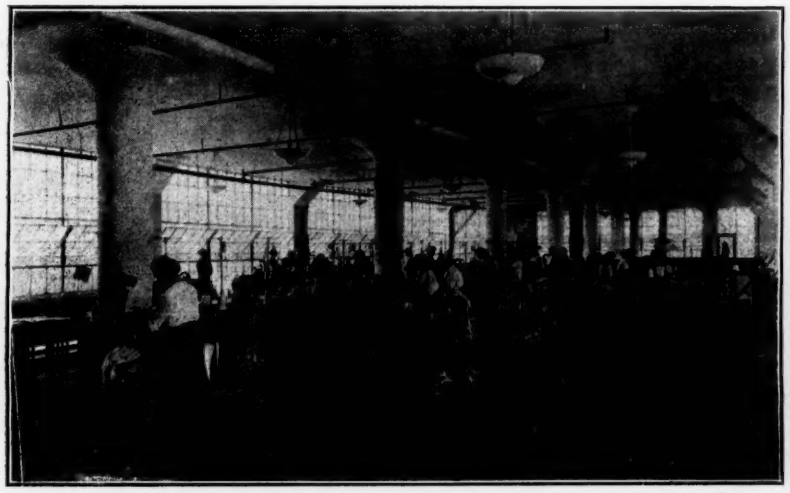
The manufacturing building was constructed as an extension to an existing building, while the bleachery, at right angles to the foregoing structure, replaced an older building. The storehouse, erected at an angle across the end of the manufacturing building, makes a bend to follow the curvature of the railroad siding and so joins onto the bleachery.

The group thus forms a triangle with an open court in the center. The toilet rooms, stairs and elevators in the two working buildings are arranged in banks against the storehouse walls so that all three buildings are served with two groups of such facilities.

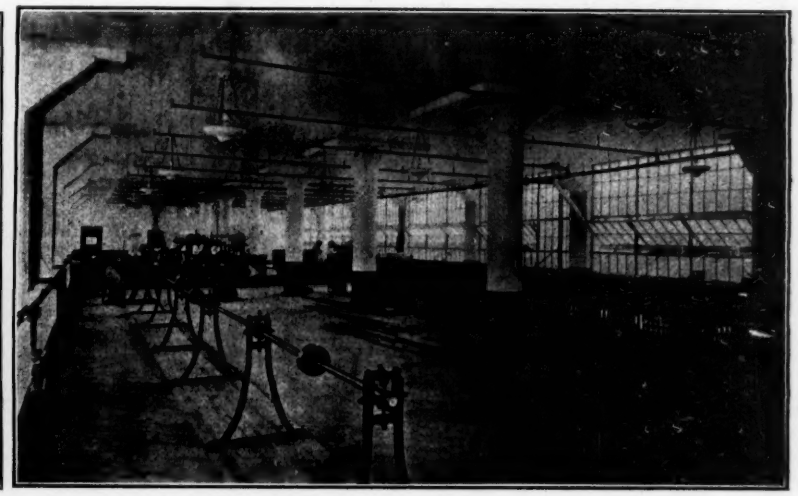
The manufacturing building and the storehouse, as built from the plans of Lockwood, Greene & Co., engineers, are entirely of reinforced concrete, with steel factory sash and brick curtain walls. The former building, three stories high and 110 feet by 63 feet, forms the extension of the existing manufacturing building, which is a brick and timber structure two stories high. The existing end wall was removed and the floor plank supported on a new concrete beam.

The storehouse has six stories, with the platform for the railroad siding coming at the third story, due to differences in level between the tracks and factory yard. The platform is covered by a hanging canopy for protection from the weather. A portion of the second story floor slab was omitted to permit of the formation of a driveway into the building on the ground level. One end of the storehouse has a temporary brick wall supported on each floor on the concrete to allow for future expansion in this department.

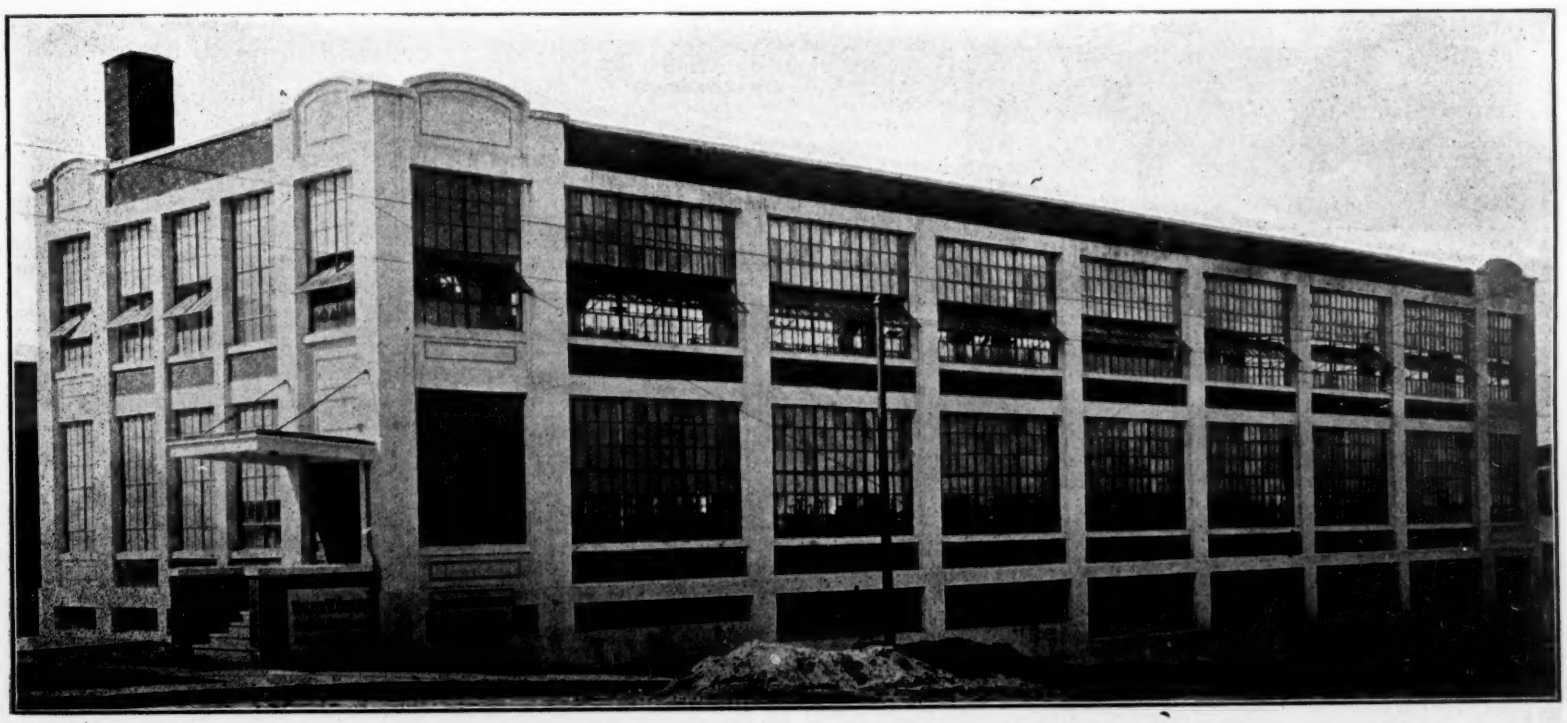
The bleachery was erected to replace an older structure and during the construction work production was carried on with no loss of time. In fact, as fast as new machinery units could be installed production increased. The new structure has concrete columns and a concrete roof, while the second floor, built as a gallery over machines, was constructed of wood. A wood monitor provides ventilation for the whole building. The outside walls are built of brick between concrete columns and the windows are made of wood.



KNITTING ROOM, BLACK CAT TEXTILES CO., SHEBOYGAN, WIS.



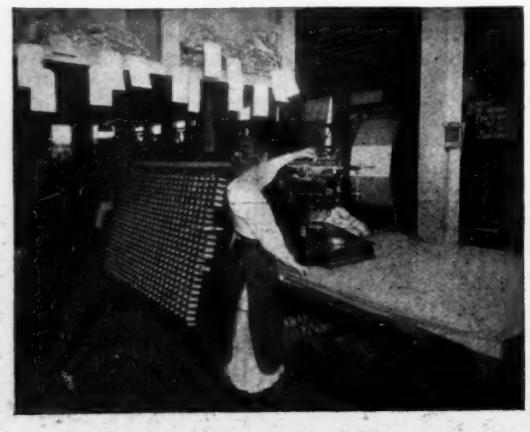
LOOPING ROOM, NEW BUILDING OF BLACK CAT TEXTILES CO., SHEBOYGAN, WIS.



NEW BUILDING OF BLACK CAT TEXTILES COMPANY AT SHEBOYGAN, WIS.

EVERY ONE A MINUTE SAVER

They Overcome Labor Shortage—Cut Costs—Speed Up Production

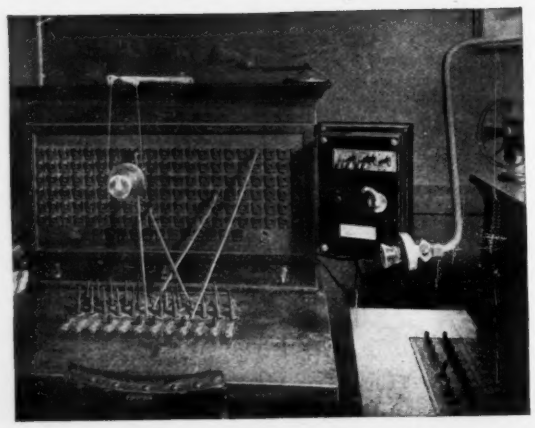


NATIONAL COUNTING MACHINES

THEY give you almost instantly the correct count of bulk lots containing thousands of pieces of any kind of like unit material. No pad and pencil calculations, consequently no errors from brain fag. One machine saves the labor of many hand counters.

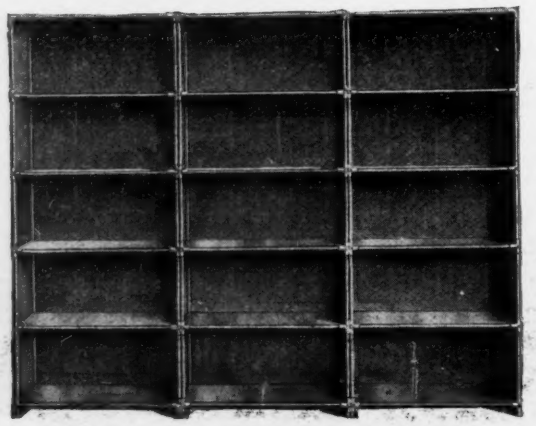
NATIONAL CHAPMAN — Elevating Rollers — Bearing Trucks

ONE of these trucks with a set of detached platforms enables one man to do as much work as three or four men operating old fashioned, fixed platform trucks can do. It saves 75% of the time usually wasted in useless loading and unloading operations. All trucks equipped with Hyatt Roller Bearings. Girl workers can handle them easily.



NATIONAL CALLING SYSTEM

THE "Instant Man Finder." It sends electric code signals to all parts of the mill. No disturbance of workers. The Saquoit Spinning Company of Capron, N. Y., say this about their National Calling System: "We cannot recommend this arrangement too highly, as we feel the installation has more than paid for itself in time saved."



"MULTI-UNIT" SECTIONAL STEEL SHELVING

Powerful Convenient Unitary — **Adjustable Fireproof Inexpensive**

THIS shelving is furnished in plain shelves or with bin fronts and dividers to make compartments of varying dimensions. Plain steel or baked enamel finishes.

WAR time necessities have already brought about a labor scarcity which seems likely to grow worse instead of better, to say nothing of the largely increased cost of manufacturing.

So it has now become more than ever desirable to determine the exact cost of each operation and to get that cost down to absolute minimum.

Years before the war began thousands of leading American manufacturers in more than one hundred separate industries were saving labor and cutting costs in various departments by the use of National Factory Efficiency Equipment.

What was necessary and desirable equipment then is more necessary and more desirable under present conditions.

Our new, big, profusely illustrated Catalog No. 14 giving a complete description of National Factory Efficiency Equipment is just off the press. This book contains many valuable suggestions on money saving mill management. Perhaps you will want a copy.

National Scale Company

12 BRIDGE STREET
CHICOPEE FALLS, MASS.

Reconstruction at Appleton Mills, Lowell, Mass.

Plant Has Been Entirely Reconstructed During the Last Two Years

WHEN a mill erected many years ago finds its old constructions disadvantageous and contemplates the erection of new buildings occupying the same space as the old construction, it will be worth while to investigate the records of such undertakings carried on in the textile industry.

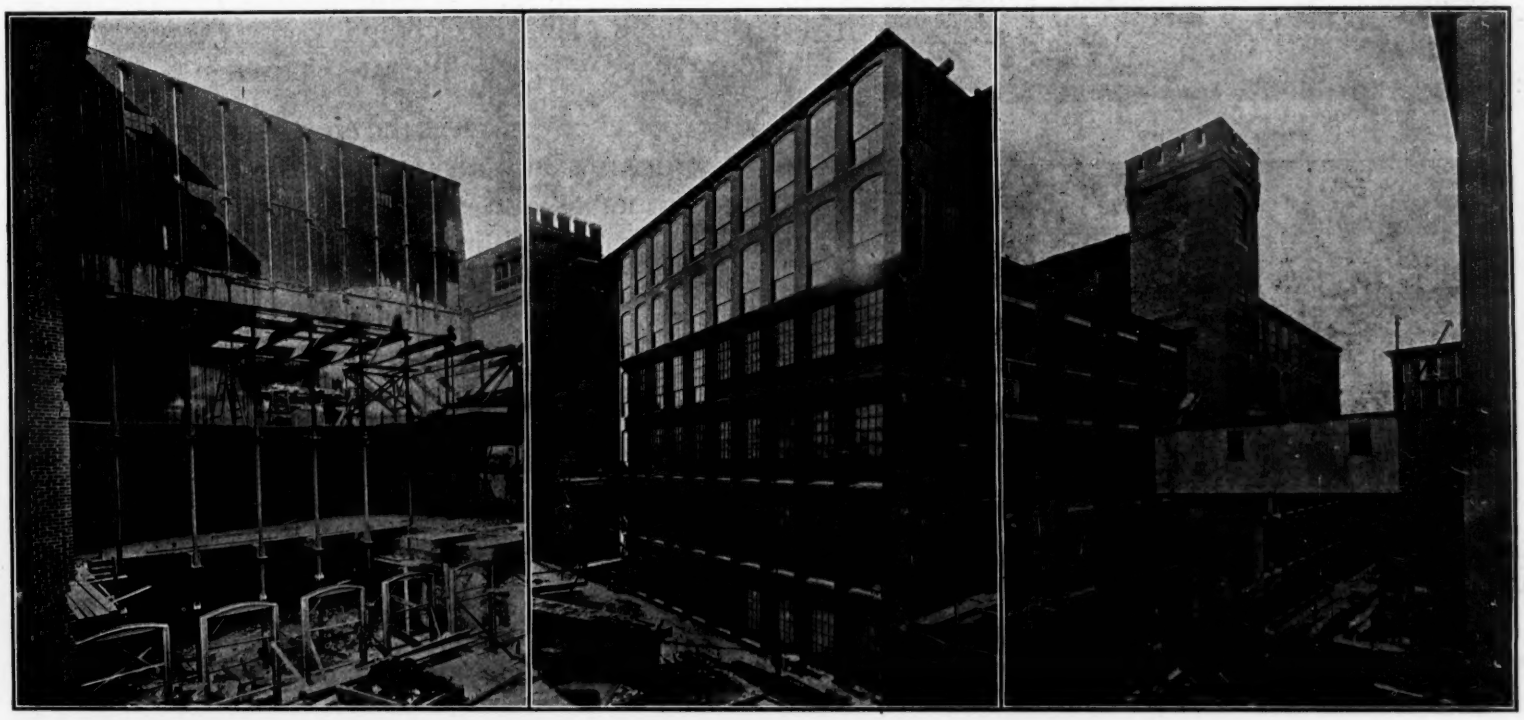
Minor reconstructions of such character have been made during the year in several instances, but perhaps the most notable work of reconstruction was done at the Appleton Company's mills at Lowell, Mass., where, with the exception of one structure, the whole work is completed.

The original plant of the Appleton Mills consisted of two four story buildings erected in the year 1828, to which new units were gradually added. Two years ago the plant consisted, besides the original main building and connecting mill, of a dyehouse and various other wings. The dyehouse extended along the Pawtucket Canal in the rear of the old mill.

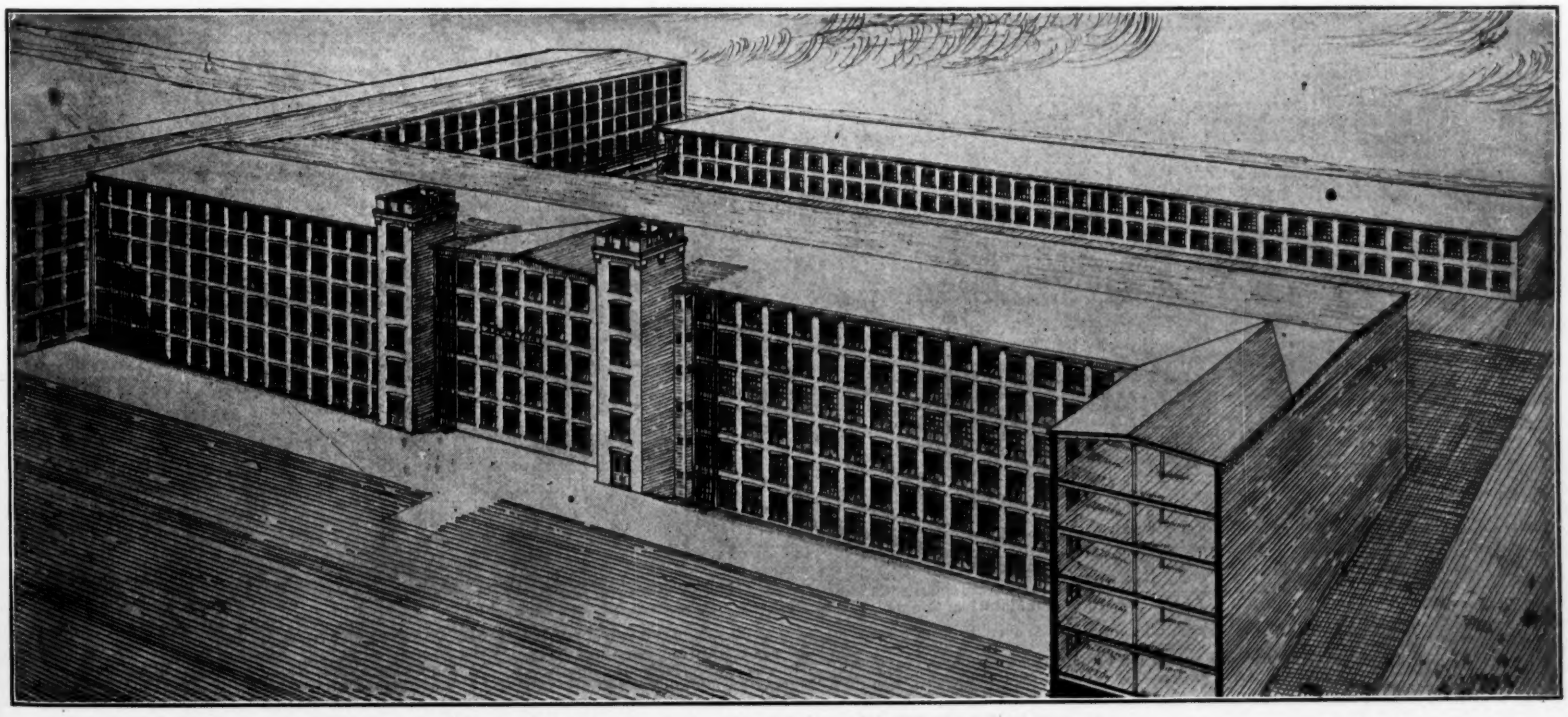
In 1916 it was decided to modernize the whole plant and add additional constructions, and the New England Concrete Construction Company of Boston, Mass., was called into consultation in reference to the contemplated changes. After careful investigation, a plan was made which included, among the other things, an addition to the dyehouse along the canal and a total reconstruction of the main building into a six story modern mill on the space occupied by the old building, but thirty feet wider. The plan also included new foundations for a generator under the raceway and concrete wall for the canal, the removal of various wings, and a new bridge connecting the dyehouse and the main mill.

To accomplish all these changes without causing disturbance to the production of the mill required very careful planning. A problem like this required tests and investigations, that the contemplated temporary arrangements should not interfere with the production. In many instances changes had to be made over Sunday or overnight, and a miscalculation of the magnitude of the work or a careless division of labor might delay the completion and the production of the mill would suffer.

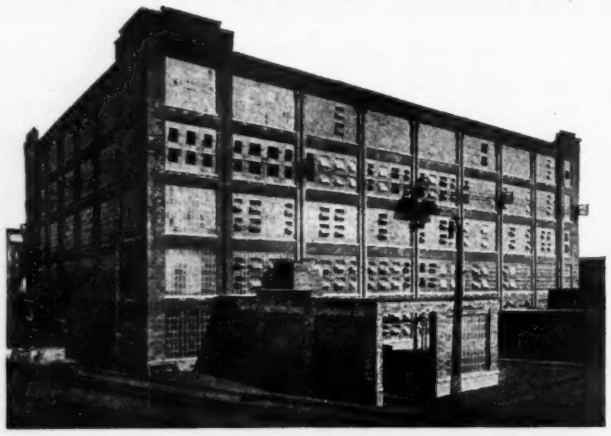
There was another factor that needed minute attention—the safety of the workers. Under the stress of rush performance, workers are apt to become careless and need constant supervision of the engineer. Accidents usually happen in such instances when workers disregard the necessary safety provisions and concentrate all their efforts on quickness of performance. This is only



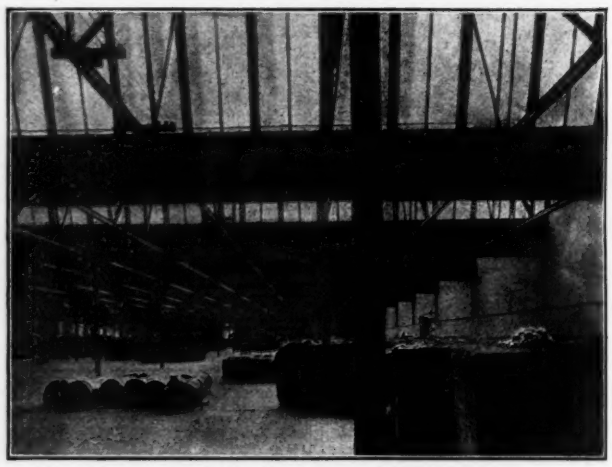
RECONSTRUCTION OF THE APPLETON MILLS, LOWELL, MASS. THE CHANGE FROM AN IRREGULAR, CUT UP, OLD FOUR-STORY MILL, TO A MODERN SIX-STORY MILL WAS ACCOMPLISHED WITHOUT A MISHAP TO LIFE OR MACHINERY AND LITTLE DELAY IN PRODUCTION



BIRD'S-EYE VIEW OF RECONSTRUCTED PLANT OF APPLETON MILLS, LOWELL, MASS.



Botany Mills, Passaic, N. J.



Brighton Mills, Allwood, N. J.

MILL CONSTRUCTION
OR
REINFORCED CONCRETE?

No matter what type of construction you choose for your new plant, this company can execute the building work with absolute satisfaction.

Our experience embraces the erection of any number of structures in both mill construction and reinforced concrete, and our representative would be pleased to discuss building problems and costs with you.

John W. Ferguson Co.
Engineers and Contractors.

253 Broadway NEW YORK
152 Market Street PATERSON, N. J.

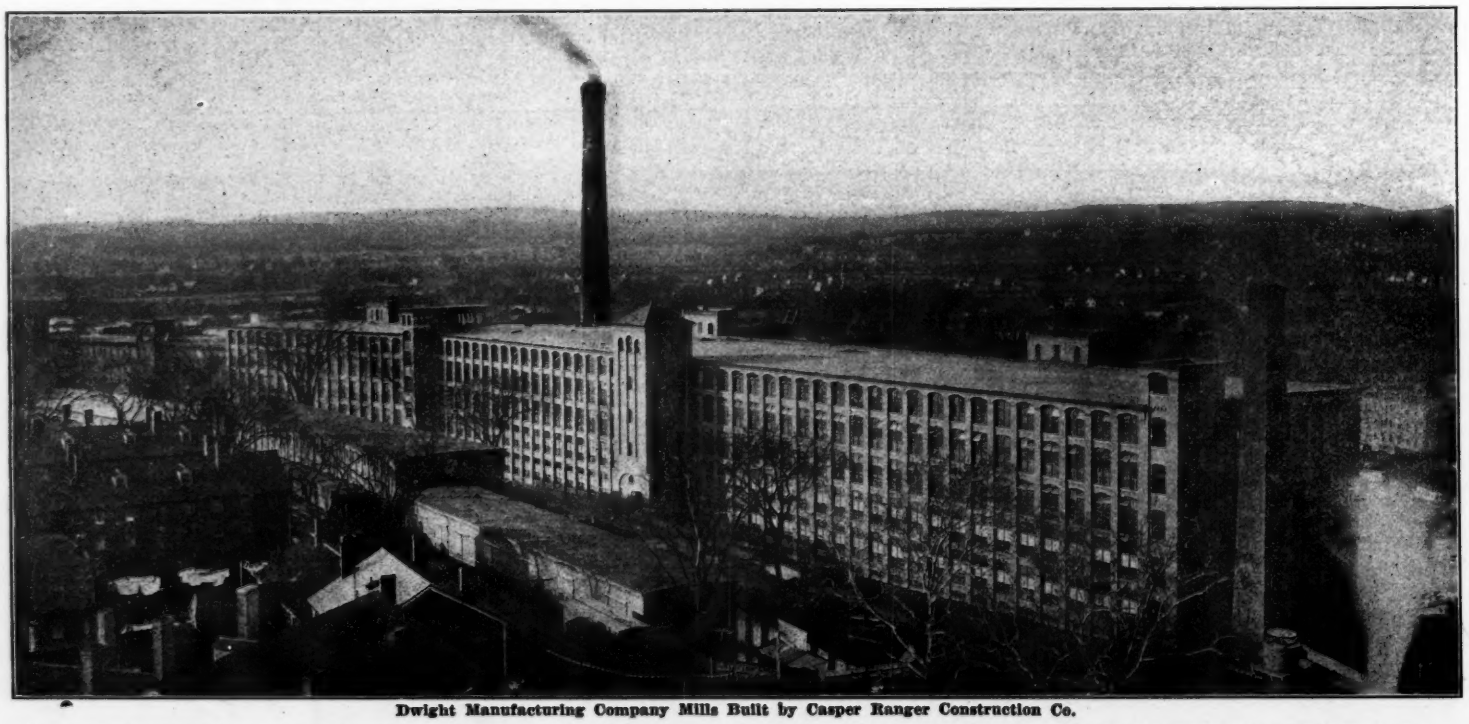
Established 1892

65-57

CASPER RANGER CONSTRUCTION COMPANY

Springfield, Mass. HOLYOKE, MASSACHUSETTS New York, N. Y.

TEXTILE CONSTRUCTION A SPECIALTY



Dwight Manufacturing Company Mills Built by Casper Ranger Construction Co.

A Prominent Manufacturer was asked why he turned over to the RANGER Company all his large building jobs. Here is his reply: "In my opinion the RANGER Company is just a little more careful and a little more prompt than other like organizations. They are a little more cheerful in their dealings with men; they show a greater desire to please. I believe they are a little quicker to catch an idea and give it expression—and on the whole, more reliable."

THE FOLLOWING PLANTS WERE CONSTRUCTED BY THIS COMPANY:

Dwight Mfg. Co., Chicopee, Mass.
Lyman Mills, Holyoke, Mass.
Germania Mills, Holyoke, Mass.
Wm. Skinner & Sons, Holyoke, Mass.
Whiting Paper Co., Holyoke, Mass.
Collins Mfg. Co., No. Wilbraham, Mass.
Farr Alpaca Co., Holyoke, Mass.
West Boylston Mfg. Co., Easthampton, Mass.

IF YOU CONTEMPLATE BUILDING WRITE US FOR ESTIMATES

for the workmen engaged in the building operations, but how about the safety of the employes of the mill?

Whole sections have been torn away during the construction, supporting columns removed, openings chopped in the floors to be used as ways of transportation. All this involved a constant care of safety to ensure stability of the buildings and prevent serious accidents.

DESCRIPTION OF CHANGES

To appreciate the task confronting the engineers, the following description of changes will be interesting to note:

Before the addition of the dyehouse could be commenced, a new canal wall had to be built and hundreds of yards of fill deposited to serve as the foundation of this extension of 52 x 164 feet.

Practically all the work of the canal wall had to be finished between Saturday evening and Monday morning. This work consisted of the extension of the raceway from the two large wings across the side of the new dyehouse, and during this period of time the preliminary work had to be done and time given to have the concrete set. This wall of concrete is two feet thick, ten feet high, and fifty-two feet long.

The requirements were carefully determined in advance and the lumber for the concrete forms cut to proper sizes and placed ready for use, together with stone, cement, mixing machinery, and other necessary paraphernalia, near the work to be completed.

Within thirty-five hours the forms had to be set up, the wall poured in, and sufficient time given for setting, otherwise the force of water would take it down the stream Monday morning and destroy the whole construction. The work was carried on in schedule time and proved a success.

Another very delicate task of similar caliber was the changing of the foundation of the generator under the raceway. To make this possible, pulleys carrying 36-in. belts were secured and braced from the second floor to temporarily secure the generators fastened to the ceiling, and the original floor entirely removed over the second raceway, changing even the supports of the governor, without stopping the machines.

This was also a thirty-six-hour job, between Saturday night and Monday morning. The entire foundation for the ten-ton generator was erected from the bottom of raceway to setting of anchor bolts to secure the machine in place.

In another thirty-six hours the concrete foundation around the present cast-iron columns in the basement for the support of the new six-story building was finished ready for the new generators and the other necessary machinery. The work of reconstruction has been carried on without a single accident either to the builders, the employes of the plant, or to machinery.

STEPS IN WORK

To show the consecutive steps, three floor plans have been prepared:

Plan A, showing buildings before alterations.

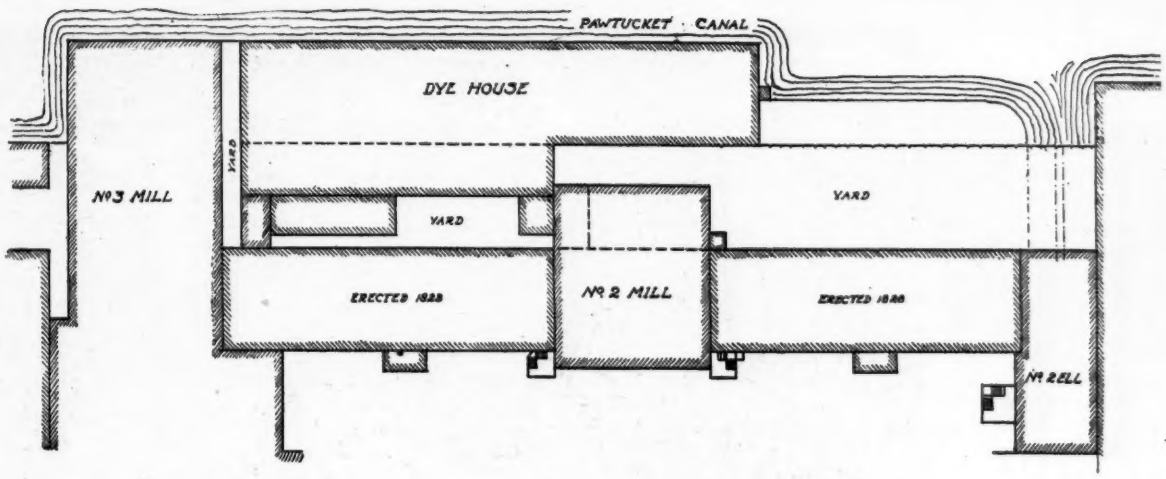
Plan B, showing the new buildings in order of reconstruction.

Plan C, showing completed buildings as reconstructed.

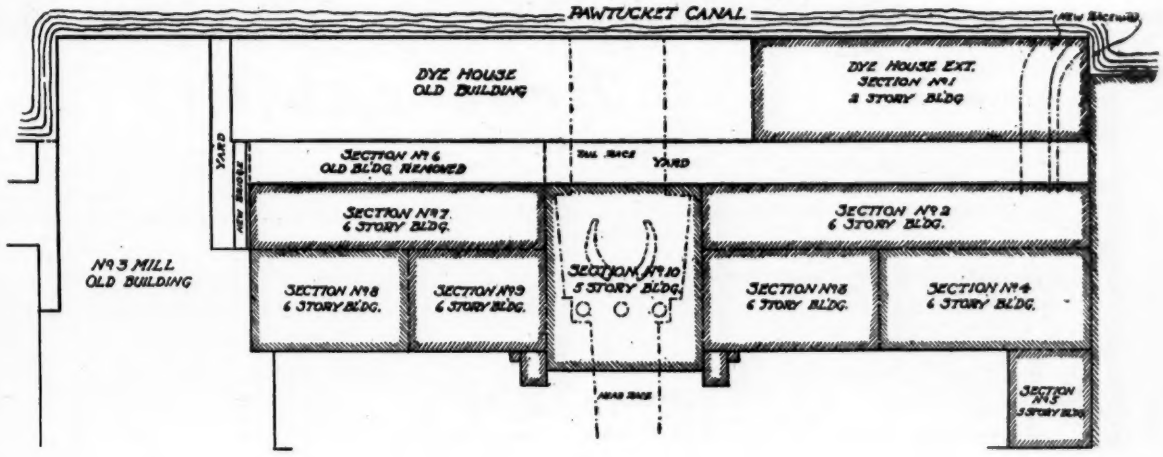
The order of reconstruction was as follows:

First Task. Addition of a section, 52 x 164 feet, to the dyehouse, over the raceway of the Pawtucket Canal.

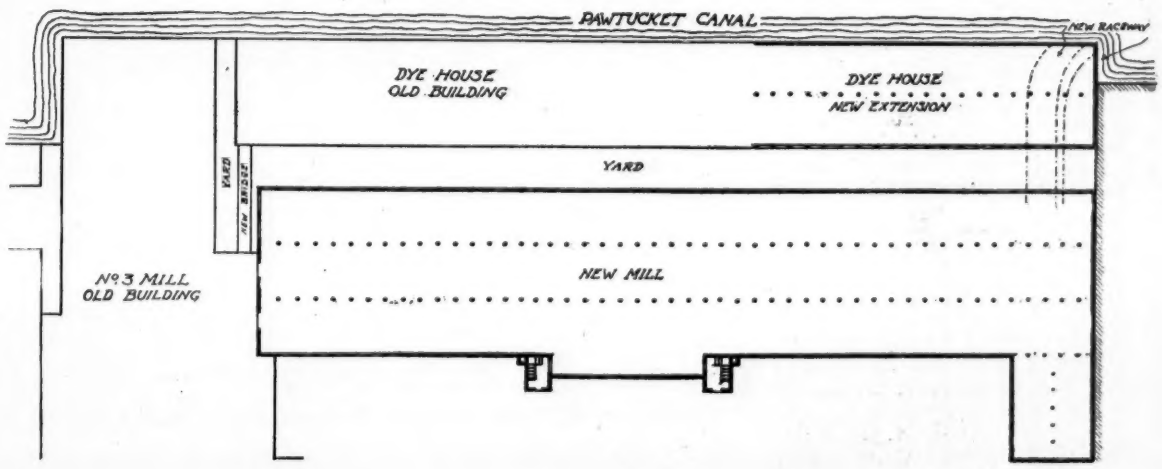
Second Task. The erection of a new six-story standard mill construction of slow burning type, 30 x 175 feet. This building has been erected, completely furnished with heating, lighting and transmission facilities, and the places of the various machines carefully laid out.



A PLAN SHOWING BUILDINGS BEFORE ALTERATIONS


PAWTUCKET CANAL
DYE HOUSE OLD BUILDING
DYE HOUSE EXT. SECTION No 1 3 STORY BLDG
SECTION No 6 OLD BLDG. REMOVED
YARD
SECTION No 7. 6 STORY BLDG.
SECTION No 2 6 STORY BLDG.
No 3 MILL OLD BUILDING
SECTION No 8 6 STORY BLDG.
SECTION No 9 6 STORY BLDG.
SECTION No 10 5 STORY BLDG.
SECTION No 5 6 STORY BLDG.
SECTION No 4 6 STORY BLDG.
SECTION No 3

B PLAN OF NEW BUILDINGS IN ORDER OF RECONSTRUCTION



C PLAN SHOWING COMPLETED BUILDINGS AS RECONSTRUCTED

SCALE

PLANS EXPLAINING RECONSTRUCTION WORK AT APPLETON MILLS

Third Task. All machinery located in the old mill, marked as Section 3, has been moved into the new building. Section 2, and immediately put into operation. The moving operations have been so successfully timed and directed that within a half hour of the time of dismounting a card the same machine was in full operation in the new building, while the spinning frames have done this feat in two hours after the time of dismounting.

Fourth Task. The old four story building, Section, 3, removed, and a new six story building, 40 x 85 feet, erected adjoining Section 2.

Fifth Task. Machinery in the old structure of Section 4 moved into Section 3, also from the adjoining ell and a continuation of the six story building erected.

Sixth Task. The remaining part of the old ell removed and the five story building erected.

Seventh Task. Part of the old dye house, 20 x 140 feet, marked as Section 6, removed after a new wall, making the building rectangular, was constructed.

Eighth Task. A new six story building, Section 7, erected, 140 x 30 feet, adjoining the building over the head race.

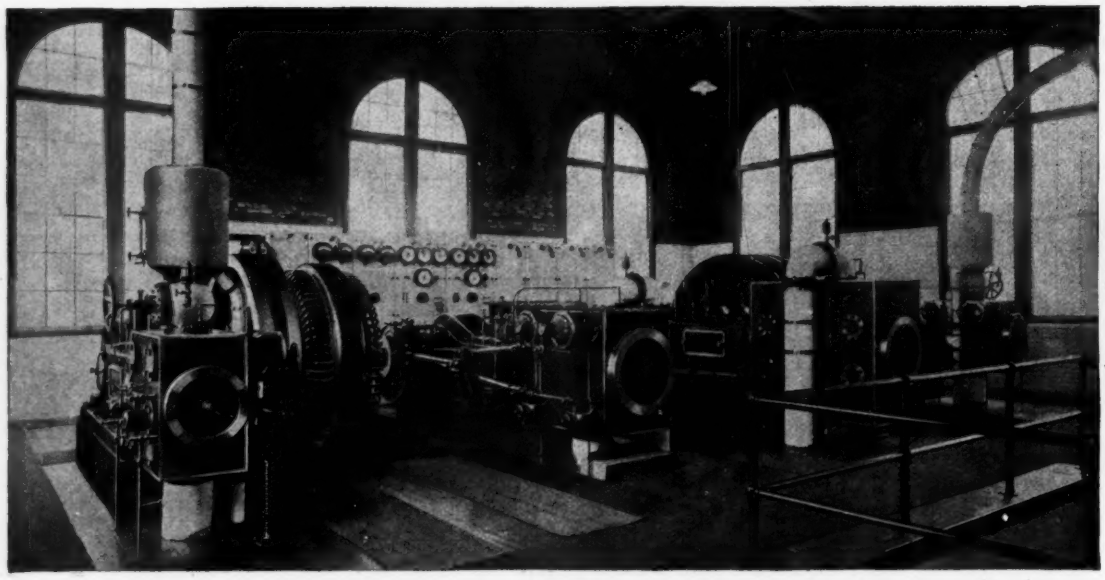
Ninth Task. All machinery of the old mill, marked as Section 8, moved into the completed Section 7.

Tenth Task. The old mill on space of Section 8 removed and a new mill, a continuation of Section 7, erected.

Eleventh Task. All machinery from the old mill, marked Section 9, moved into the completed new mill, Section 8.

Twelfth Task. The old mill, marked Section 9, removed and a new mill, a continuation of the six story building, erected and joined to the other sections.

A comparison of Plan A with Plan C will show radical changes in the shape of the mill buildings which previously had been cut up into sections now forming a complete unit.



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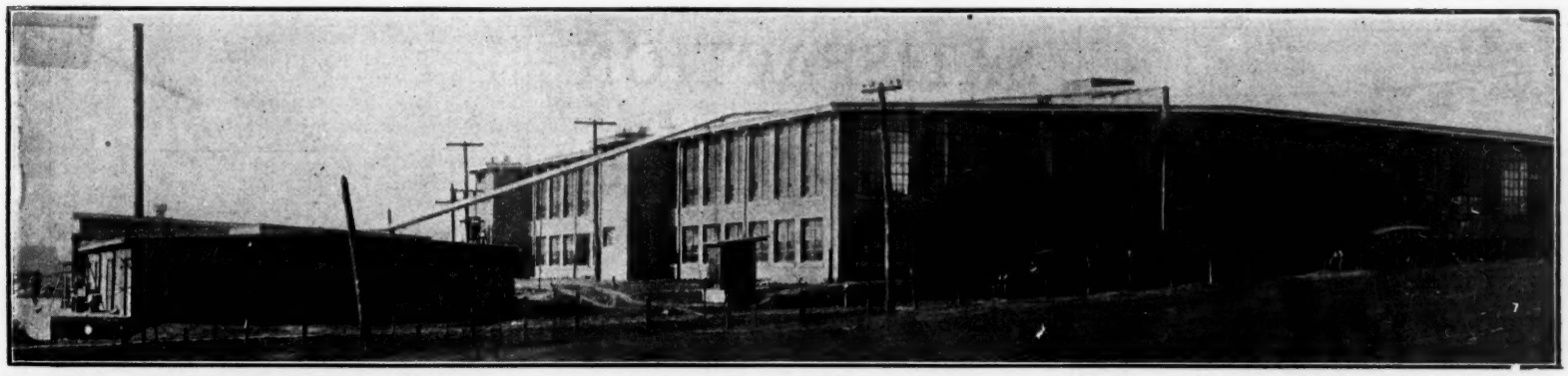


FINE COMBED YARN PLANT OF CHEROKEE SPINNING CO., AT KNOXVILLE, TENN.

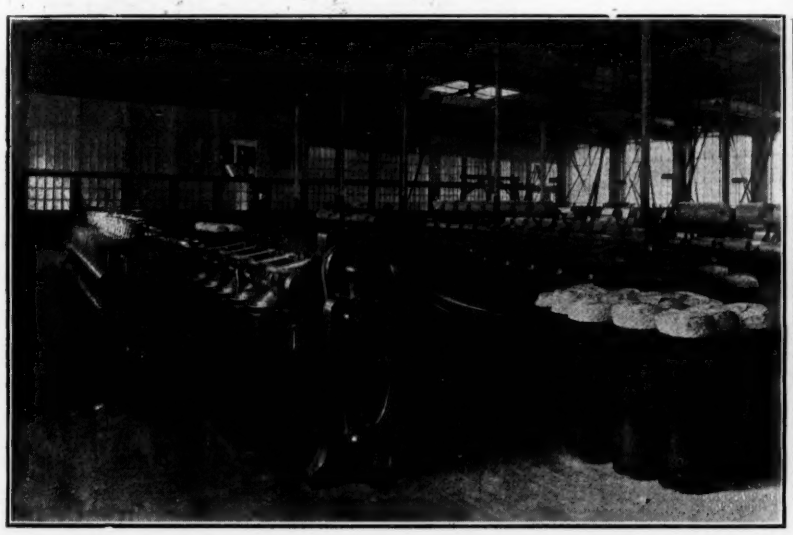
Cherokee Spinning Co., Knoxville Tenn.

Modern Fine Combed Yarn Mill Provides for Future Extension

DURING the year an interesting fine combed peeler yarn mill was established at Knoxville, Tenn., by the Cherokee Spinning Co. The management decided upon Knoxville as an advantageous location because of the excellent labor conditions and because it was felt that Knoxville is a progressive, growing city with good railroad facilities and advantageously situated as regards the cotton belt and coal fields. The weekly production is about 6,000 pounds of combed peeler yarn from 50s to 80s, single and 2-ply, especially adapted for the hosiery trade and for mercerizing.

DETAILS OF BUILDING

The equipment includes 5,000 spinning spindles and 2,500 twisting spindles. The mill building is standard mill construction, brick walls, cast iron columns and tar concrete floor resting on earth. The outside dimensions are 132 feet wide by 208 feet long. One end of the building is formed of wood frame construction so that the plant may be extended in the future. One section of the basement is excavated and finished for machine shop, heating and ventilating plant, etc. The bays are 10 feet 8 inches; 8 feet 8 inches of which is glass, making an exceedingly light room for both the carding and the spinning. They also have a double row of skylights so that they depend on artificial light only in the late afternoon and early morning. Steel sash are used in the mill windows. At the sides of the mill the window frames are carried up to the roof line, obviating the use of brick arches over the windows. The roof is provided with ventilators.



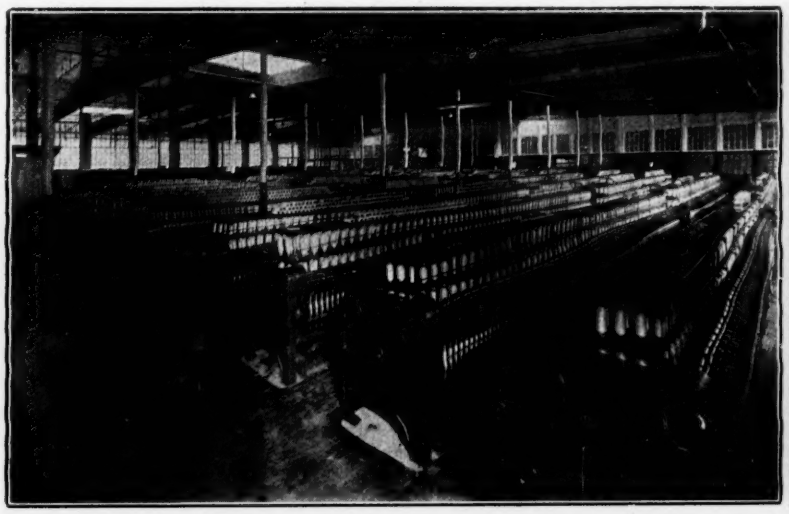
SECTION OF CARD ROOM, CHEROKEE PLANT

ROVING FRAMES IN CHEROKEE SPINNING COMPANY'S PLANT

The warehouse is of wood construction, brick ends, 50 x 100 feet. The corner is taken off of this warehouse for an opening room, and a fire wall is built around it. Cotton is received in the warehouse, trucked into the opening room where a week's run may be kept open at all times; sucked into the picker room by means of an overhead conveyor system and space is provided in this room to keep three days run open all the time.

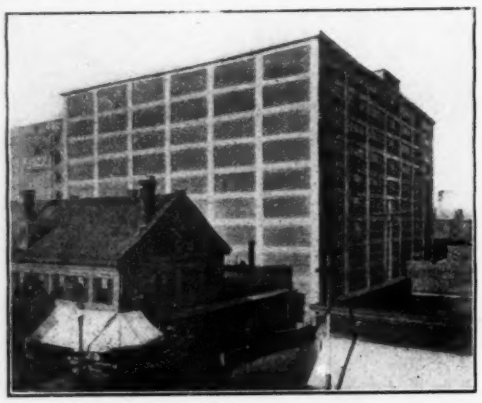
The machinery was furnished by the H. & B. American Machine Co., with Whitin combers, Draper spoolers, warpers and reels, and Foster winders. They are using electric power throughout from the Knoxville Ry. & Light Co. There are individual motors on the opening and picking machinery; one large motor to run all the cards; one motor to run the combers and the lap machines; individual motors on the drawing frames and two motors to run the rest of the roving machinery.

In the spinning room every frame is



SECTION OF SPINNING ROOM, CHEROKEE PLANT

SECTION OF SPINNING ROOM, CHEROKEE PLANT



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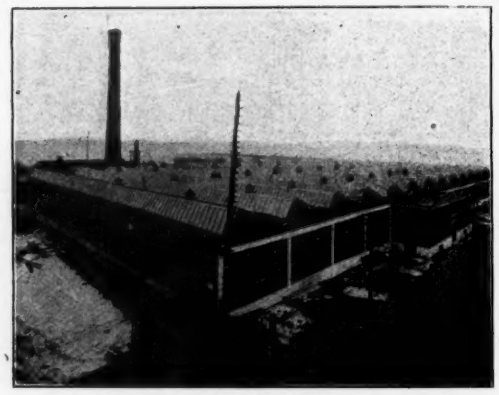

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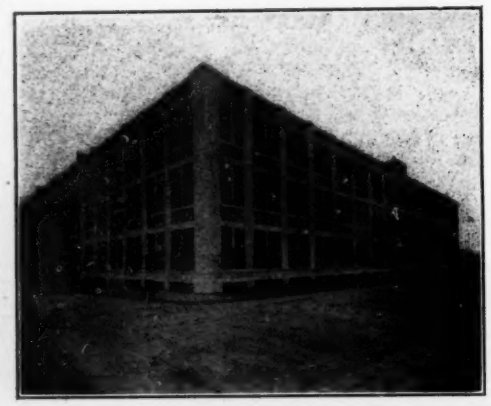
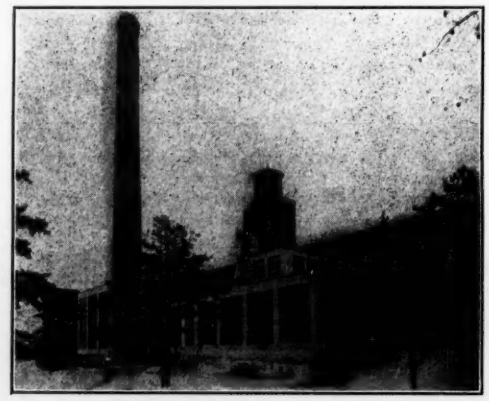
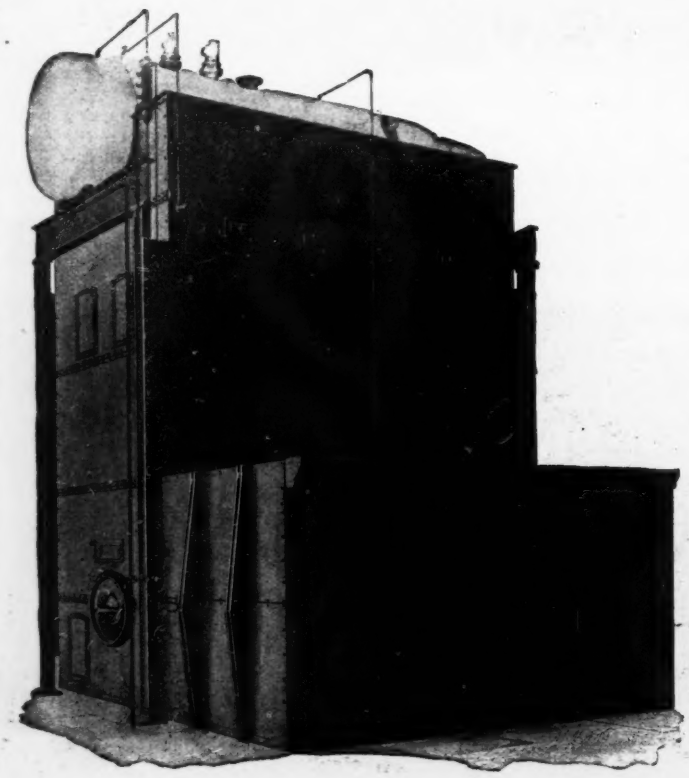


United States Fastener Company



W. H. McElwain Company

Built for the Next Generation



All good work is done for the next generation. The great Pennsylvania station in New York was built for the next generation—that is, it has the stability and size to handle all the demands, which not only this but the coming generation, can put upon it.

So with bridges, tunnels, dams, machines—so with power plant equipment, boilers most of all.

Why?

Because "good for the next generation" means that a structure, a machine, a boiler has a surplus of strength above all demands which apparently may fall on it.

In the power plant, the boiler needs this surplus most of all.

And Erie City Boilers *get it*.
Let us tell you how.

ERIE CITY IRON WORKS

ERIE, PA.

equipped with its own motor driven by a silent chain, furnished by the Link Belt Co. The twisters are equipped in this way also. The spoolers are directly driven with individual motors. One motor drives four reels and the winder has its individual motor with chain drive. All motors were furnished by the General Electric Co. and are of textile design.

The central heating and ventilating system is in the basement. They have installed a system of air conditioning furnished by Stuart W. Cramer, Charlotte, N. C. All of the air which comes into the mill is washed and all impurities taken out. In the winter this air is heated and in the summer cooled. It is delivered into the mill through ducts which run under the floor and comes out into the different departments near the ceiling. There are return ducts on the sides of the building to take out the foul air.

75 WATT LAMPS

The electric lighting is carried out with 75-watt Mazda lamps and intensive type porcelain enamel finish reflectors, which are suspended approximately 14 feet above the floor. The lamps are placed close enough together so that the rays overlap about 8 feet high, thereby doing away with shadows and throwing a sheet of light directly over the operatives' heads.

DRESSING ROOMS PROVIDED

Comfortable dressing rooms and lounging rooms have been provided in the mill for employes, and they are fitted up in a way to make for better conditions. The mill was designed by J. E. Sirrine, Greenville, S. C., and the general contractor was J. F. Gallivan Building Company, also of Greenville.

California Cotton Mills Company Increases

Design of New Building Combines Economical Layout with Attractive Architecture and Employes' Welfare

NOT all the important new construction is in the East and South, as the accompanying photograph of the new yarn mill of the California Cotton Mills Company, Oakland, California, shows. The enlargement is a four-story brick and concrete building, approximately 140 by 200 ft. of very substantial construction and pleasing architectural effect. It reflects the thought given by the mill officials to the details of an efficient manufacturing layout, combined with welfare of employes and obligation to the community in the general appearance of the plant. Where men with such ideas are in charge of an enterprise, it is a guarantee in itself of the quality of the product.

The added cost to construct a building which creates a distinctly favorable impression is not large, and J. R. Millar, general manager of the California Cotton Mills Company, states that they are well satisfied with the outcome of their work, believing that the incentive to better efforts on the part of employes makes the endeavor to provide an attractive plant worth while.

The new addition enlarges the towel, crash and heavy mechanical duck departments, and gives an increase in production of 20 per cent. The added machinery includes 50 cards, 10,000 spindles and 200 looms, the yarn machinery all being of Saco-Lowell make; and employment is given to 250 more operators. While the new mill is used entirely for yarn manufacturing and warp making, the added weaving capacity is provided by a rearrangement of machinery made possible by the added space. Each of the four floors in the new building is 126 x 204 ft., and all elevators, staircases, lavatories, locker rooms, etc., are in towers separated from the main rooms by fire doors.

Ground was broken for the new mill in February and a large force of men was employed in putting in the foundation and on the construction work, the building being completed in June. Since the latter date the work of setting up machinery as fast as delivered has been in progress, but it will still be several weeks before all the machinery is installed.

The construction is very substantial to reduce harmful vibration. Practically a million feet of lumber were used, nearly all of which is in the floors of the second, third and fourth stories, the lower story having a concrete floor. The posts are 18 x 24 ft. centers with metal caps, carrying 16 x 22 in. floor timbers the entire length of the building. Between these timbers the floor is carried, being made of 3 x 8s, 36 ft. long, interlapping and spiked together on end. On top of this solid floor, 8 in. thick, there is laid a 7/8 in. hard wood wearing floor. This construction is used for the second and third floors. For the fourth floor the 3 x 8s on end are covered with 3 x 12s laid flat on top, with the 7/8 in. hard wood wearing floor for the surface, making a total thickness of 11 7/8 in. of solid lumber. It might be mentioned that lumber prices are much lower than in the East.

ARRANGEMENT OF DEPARTMENTS

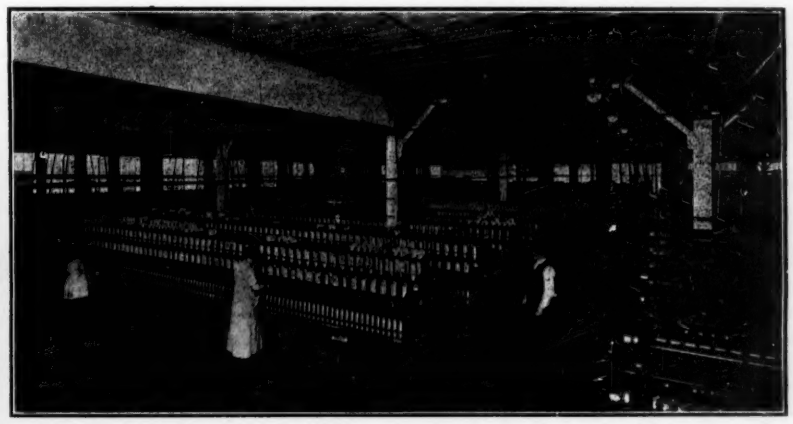
The card room is on the top story and separated from the card room by a fireproof partition. The fiber moves direct from the picker room to the card room, which is located right next to it, then goes to the drawing frames and the slubbers, which are all on the top floor. The material then goes down the elevator one floor to the speeders and roving frames, then to the spinning frames, which are also located on the third floor. It then goes to the spoolers and twisters and ultimately to the warpers and slashers, on the ground floor. The yarn is then on beams ready to be taken to the weaving sheds adjoining the new four-story building.

The routing is then one continuous movement from there on to the inspection rooms which adjoin the bleach house, where the material is bleached and dryed. The drying machinery delivers the product right into the finishing and packing room, where they are

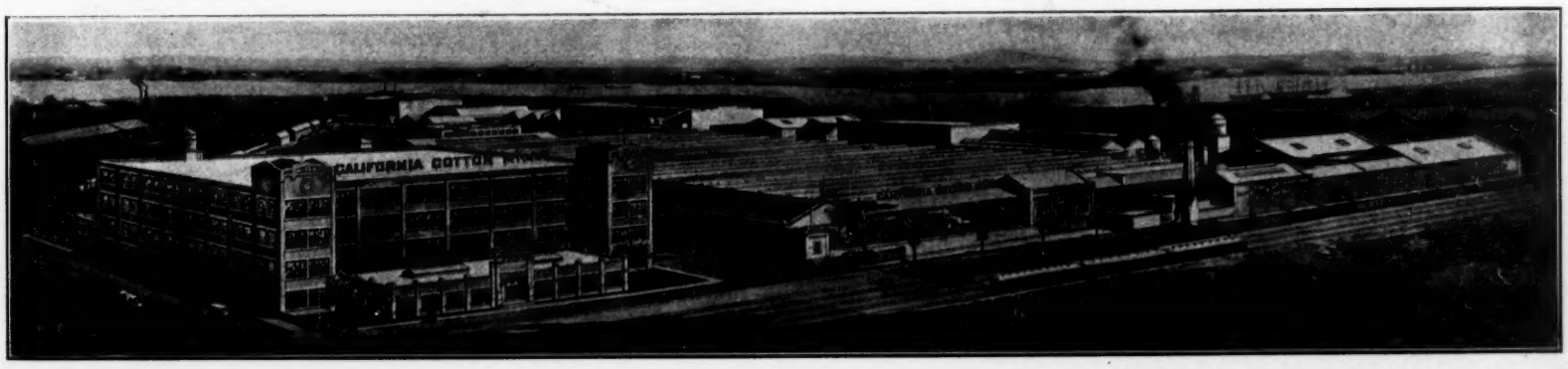
the 11 7/8 in. floor was laid especially for this operation. It was believed that the construction would avoid harmful vibration and in practice this has proved to be the case, the top floor being exceedingly rigid. The opening room is in one corner of the lower floor, separated from the balance of the building by a slow burning partition built of solid California redwood and brick, 8 in. thick.

The cotton after being opened, is blown upstairs to the finishing picker room on the fourth floor, which is also

CORNER OF THIRD FLOOR OF CALIFORNIA COTTON MILLS COMPANY'S NEW MILL

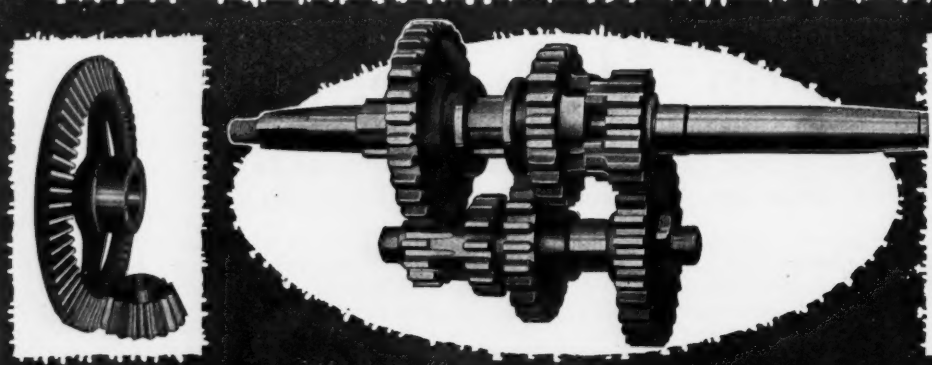


SPINNING AND TWISTING ROOM, CALIFORNIA COTTON MILLS COMPANY'S NEW MILL



GENERAL VIEW OF CALIFORNIA COTTON MILLS COMPANY'S PLANT; NEW MILL BUILT IN 1917 SHOWN IN FOREGROUND

"Zones of Quiet"



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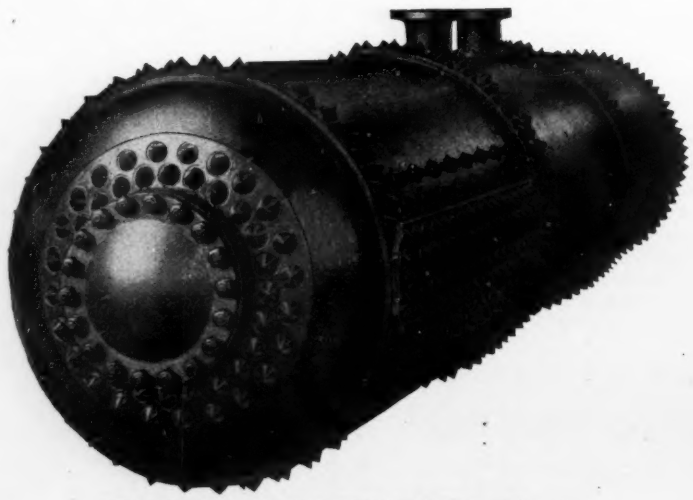

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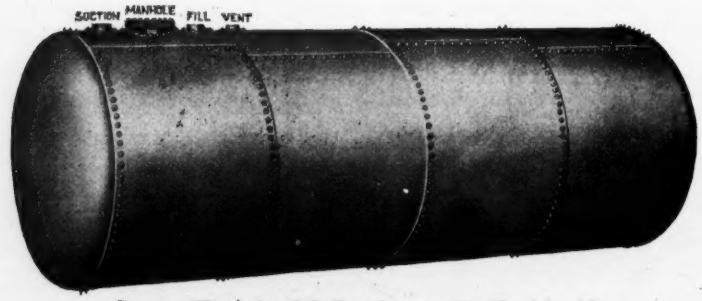

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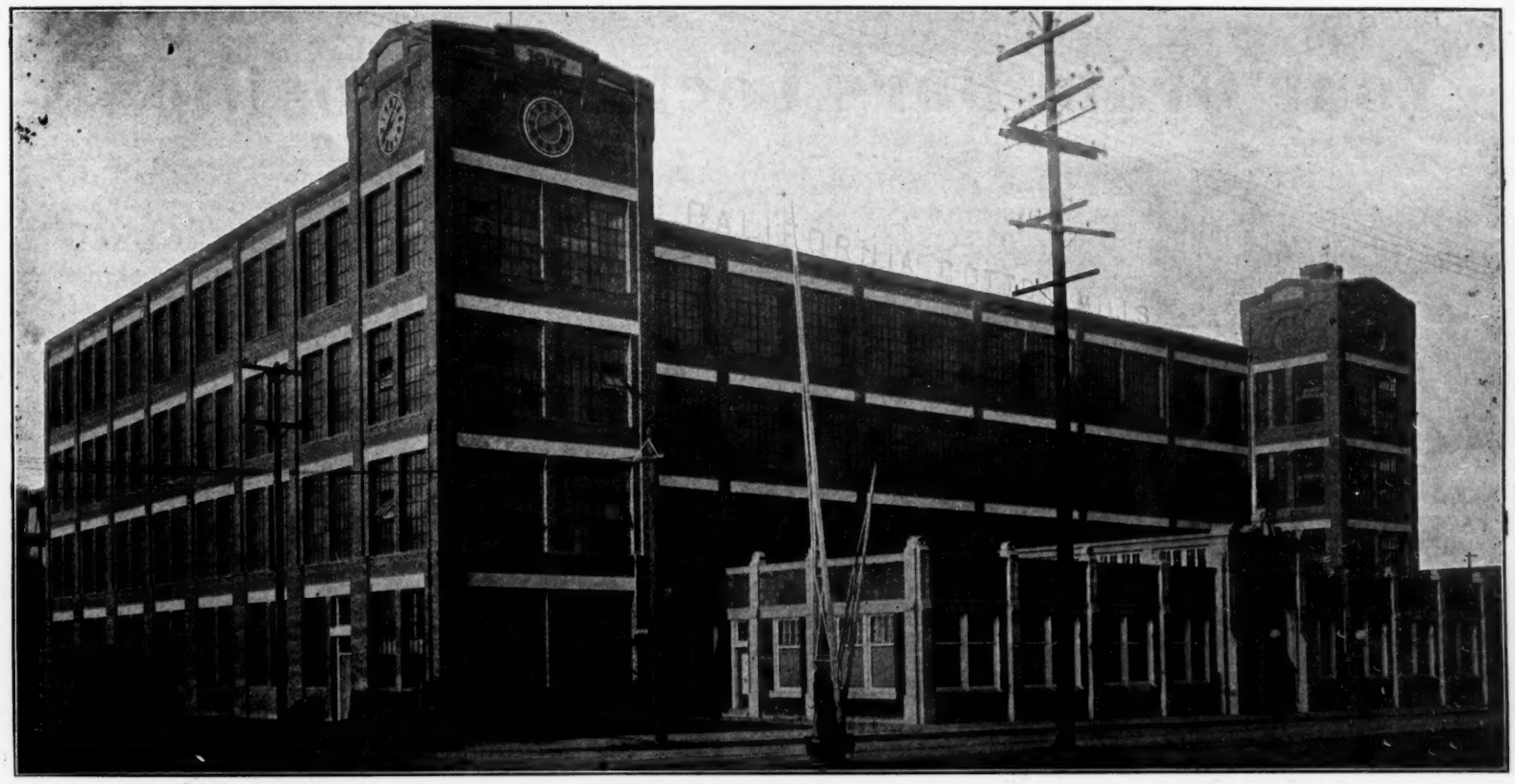


NORTH VIEW OF NEW MILL OF CALIFORNIA COTTON MILLS COMPANY, OFFICE BUILDING IN FOREGROUND

put up ready for shipment. In this way the new building was planned and arranged to fit into the general scheme of the plant and provides for handling the material with the least lost motion.

POWER, HUMIDIFICATION, HEATING

Four-frame Universal motors are used for driving the spinning frames and the other machinery is driven in groups. A sprinkler system and the Cramer humidifying system is installed in the new mill. Very little heat is required in California and the heating system is composed simply of exposed steam pipes which run the entire length of the building on each floor.

Artificial lighting is done with Mazda lamps in the center of each bay in the ceiling. Adequate daylight is provided by the large window area, fenestra sash being used, filled with wire inserted corrugated glass. All elevators, staircases, lavatories, locker rooms, etc., are located in towers and are separated from the main rooms by fire doors.

It has been found of great benefit to provide the workers with lockers. It makes them more tidy as a matter of habit and does away with work rooms being cluttered up with clothing and personal belongings. Furthermore, it has been found to reduce the possibility of theft as the company has a pass key for every locker and it is understood that the officials have the right to examine the contents of lockers at any time.

Interesting developments in connection with the welfare activities of the California Cotton Mills Co. are the hospital department and the nursery department. They treat on the average one hundred and fifty cases per week in the hospital.

About thirty babies are taken care of each day in the nursery. The children are medically examined before they are taken in to make sure that they do not carry any contagious disease which might affect the other children. All this work is done by the company's regular doctor.

Paramount Company Enlarges Waupun Mills

Includes More Space for Manufacture of Hosiery Drying and Shaping Forms

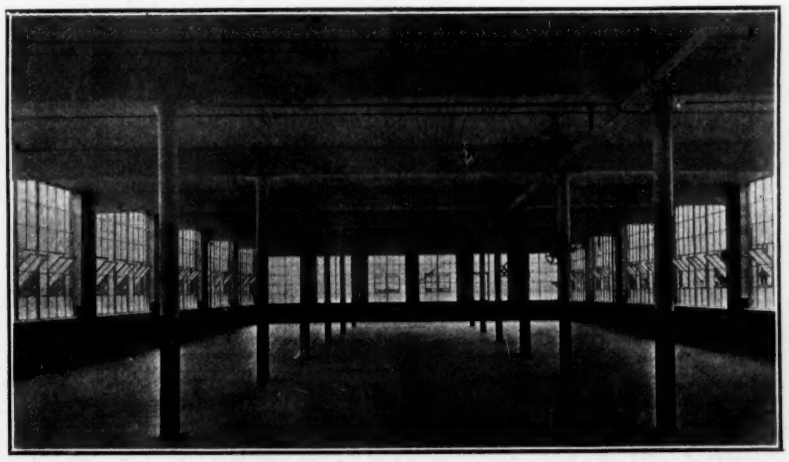
THE Paramount Knitting Company completed late in 1916 the construction of a new branch factory at Waupun, Wis., but this has been found too small, and about the middle of the year construction was started on another addition to this plant. The accompanying cut shows the appearance of the finished building. An interior view shows the details of construction and a number of novel features are included. Among these are the use of steel columns in the outside walls to reduce the width of brick piers needed, and to allow the maximum width of sash to be used to furnish ample daylight. The steel sash runs entirely up to the ceiling and are double glazed on the west side, with an air space between to reduce the amount of coal needed for heating.

NOVEL SPACING OF BEAMS

Another novel feature is the spacing of beams, which are 13 feet apart, with 5 foot plank over same. This unusual construction was selected because of the indirect lighting which is used, the object being to provide wide areas of flat ceiling unbroken by beams, to serve as efficient reflectors for light. Lighting fixtures are spaced on 13 foot centers both ways and are of the full indirect variety.

This plant is used for the manufacture of ladies' fine hosiery and for the manufacture of Paramount hosiery drying and shaping forms, showing the necessity for the expansion in the manufacturing of these well known forms that are doing so much for manufacturers in the conservation of labor, power and fuel, securing the economy that is uppermost in the minds of every one at this time. The Beaver Dam plant of the metal form company has been unable to keep up with the work on hand and this enlargement will insure the best service to mills.

The new building is arranged with knitting in the top story, looping in the second story, finishing in the first story, and the basement is used for storage of yarn and for miscellaneous storage. A modern power plant is also included.



INTERIOR VIEW, SECOND STORY, PARAMOUNT KNITTING COMPANY'S NEW FACTORY AT WAUPUN, WIS.

The new plant has a total length of 310 feet and a width of 50 feet. The 1916 construction was carried out to build to a height of three stories for a length of 120 feet, and the 1917 construction provides two stories for the balance of the length, leaving the two upper stories for a length of about 200 feet still incompleted.

The cut of the exterior shows the finished appearance. Toilet rooms, stair towers and elevator shafts are arranged in brick towers extending entirely across each end of the building, thus leaving open for efficient manufacturing the entire space between the ends of the building.

ELECTRIC GROUP DRIVES

All machinery is provided with electric drive. Purchased power is used at present in this plant, although the company are now engaged in the installation of one of the new type of Fitchburg-Prosser engines for the manufacture of their own power. All machines are driven in groups and all shafting is supported directly from the floor, there being no overhead shafting whatever in this plant.

The lighting fixtures used are of a type developed by the Paramount Knitting Company, after experimenting with various types, and are of the standard which has been adopted by them for use in all their plants. They include an enameled iron reflector, which is

Your Grate Bars Locked in Position!

An important distinctive provision of this grate is the SPECIAL LOCKING DEVICE.

The shaking arm is made hollow to receive a hand-lever, and, because of the design of the curved piece in which the shaking arm travels, this hand-lever ABSOLUTELY CANNOT BE REMOVED or put in place except when the grates are locked in smooth position. SAVES GRATES—SAVES FUEL

1. It is impossible to leave the Canton Grate partly closed with ends burning off in the fire, or

2. With unconsumed fire dropping into the ash pit.

CANTON
Shaking and Dumping Grate

This is, above all, the grate for the "Economy" plant. It appeals to the firms where savings in fuel, in labor and in repair costs are considered important.

It is especially durable, because the bars are double braced, and always present an even surface on top. No warping.

It is efficient, because it breaks up the fire thoroughly without wasting fuel—in sections—and increases boiler capacity so much as to save often the purchase of another boiler.

One firm found by exact figures that Canton Grates paid for themselves in three months in economy over the old system.

Send now for strong testimonials from important users and new Canton Grate Catalog.

W. B. McBurney, Southern Representative, 829 Trust Co. of Ga. Bldg., Atlanta, Ga.

CANTON GRATE CO., 1708 Woodland Avenue CANTON, OHIO

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Is This Your Auto Crane?

Get Lined Up Right in 1918, Both in Coal and Equipment

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ARLINGTON MILLS AMERICAN THREAD
ACUSHNET MILLS

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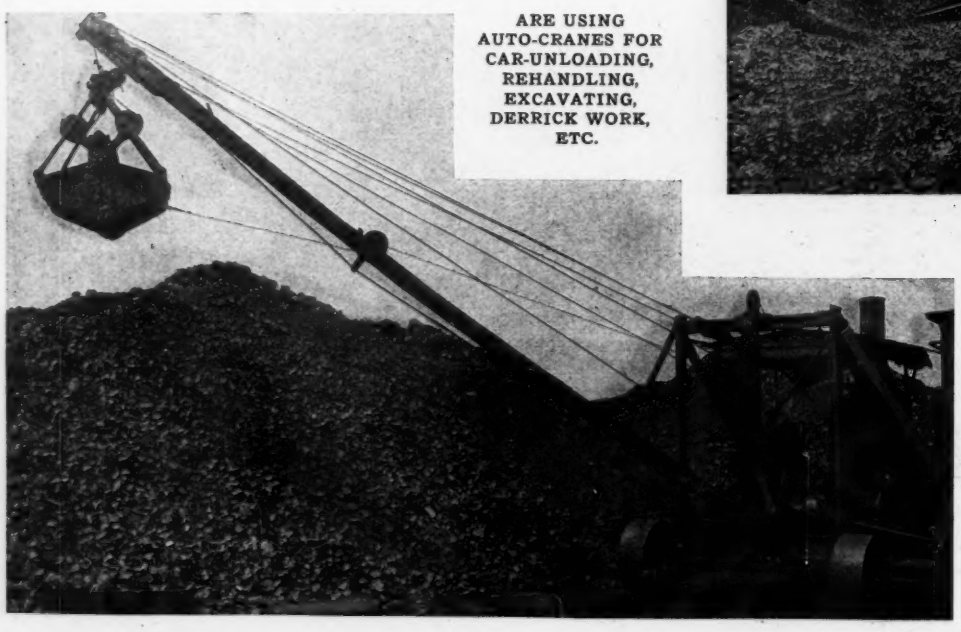
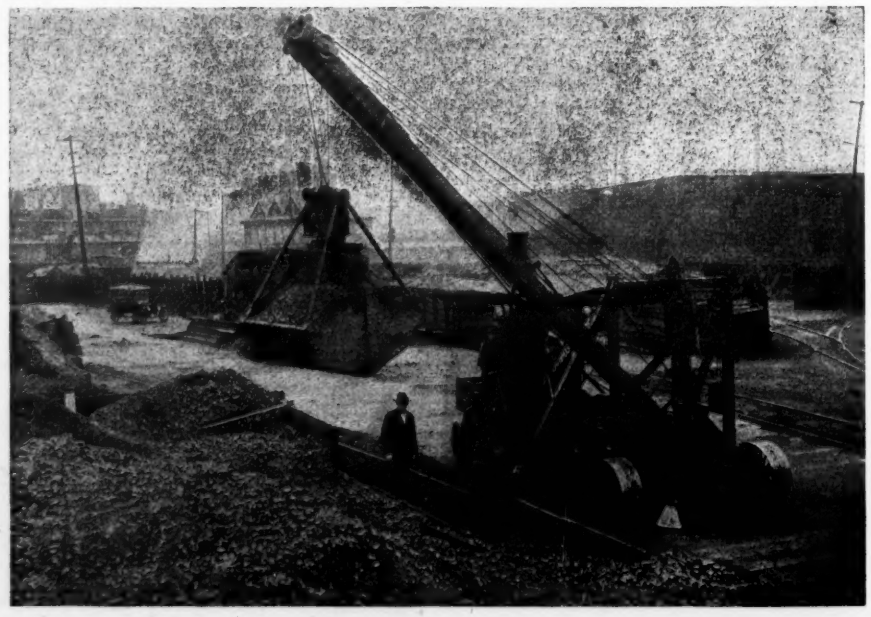




We can equip Auto-Cranes for either steam, gasoline or electric drive, and build them to run on road wheels or rail truck.

Investigate Now!

The John F. Byers Machine Co.
210 Sycamore Street RAVENNA, OHIO

readily removable from the floor for cleaning, and a regular system of inspection and cleaning these reflectors is provided.

An electric freight elevator at each end of the completed building will provide for elevator service between floors, and will also communicate with an outside shipping and loading platform at each end of the building. A dial scale is built in flush with the floor and located close to the elevator and shipping and receiving doors on the first floor.

WATER SOFTENING PLANT

The boiler room contains horizontal return tubular boilers of capacity to furnish both light and heat for the building, and at the rear of the boilers is located a "Permutit" water softening plant, this providing water for boiler feed at present and reserving capacity for the installation of a future finishing plant.

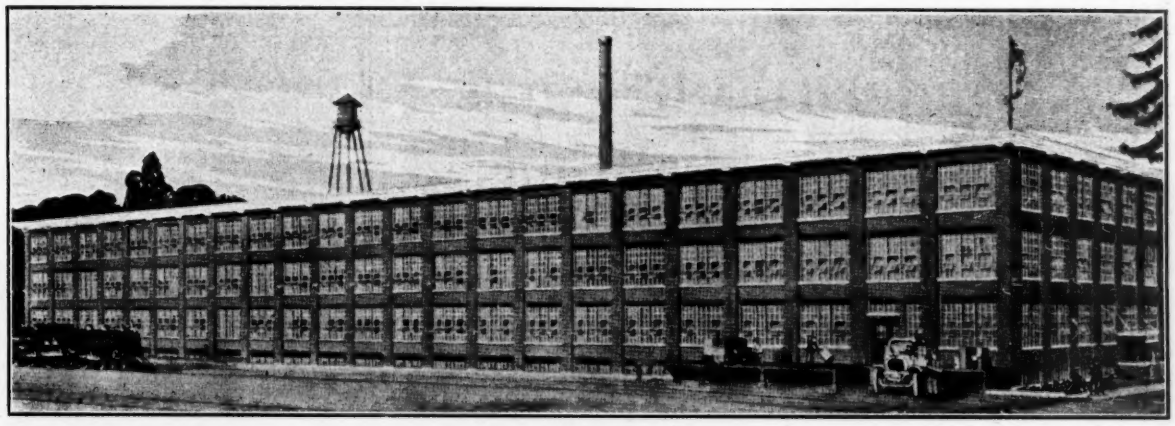
A section of the basement adjoining the boiler room is devoted to the storage of coal, and a coal pocket located just outside of the building and below the tracks will provide for the dumping of hopper cars. The section of basement occupied by coal storage is constructed entirely of reinforced concrete, including columns and ceilings, and is further enclosed by brick walls, making an entirely fireproof storage space.

LUNCH ROOM FOR EMPLOYES

This mill, as well as other plants of the Paramount Knitting Company, has been equipped with complete hospital or first aid room, and with a lunch room for factory employes.

Toilet room floors are finished in terrazzo, and all toilet rooms have enameled tile wainscot. Shower baths are provided for the employes. A landscape gardener has been employed to lay out walk, trees and shrubbery with a view to making the surroundings of the plant as attractive as possible.

The building was designed and construction supervised by the Chicago office of Lockwood, Greene & Company, engineers.



EXTERIOR VIEW SHOWING COMPLETED APPEARANCE, NEW FACTORY PARAMOUNT KNITTING COMPANY, WAUPUN, WIS.

New Mills for Holeproof Hosiery Company

Six-Story Concrete Manufacturing Building and One-Story Dyehouse with Saw-Tooth Roof

NEW buildings being erected for the Holeproof Hosiery Co., Milwaukee, are of interest both on account of the widely known products of this concern and because of the many interesting features of the additions. The enlargements comprise a manufacturing building and a one-story dyehouse adjoining it. These buildings are just being completed and will provide greatly enlarged and improved facilities for manufacturing.

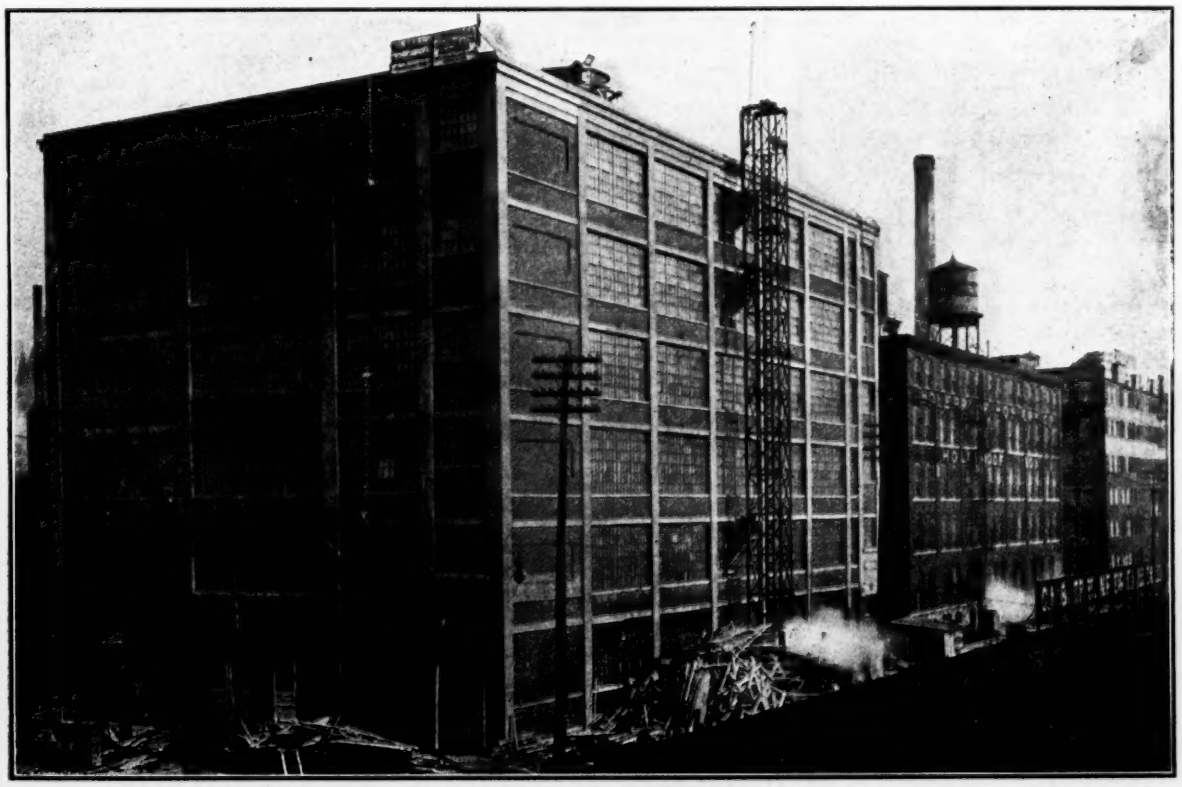
The new manufacturing building adjoins the present plant. It is connected with the present buildings by a bridge at the third and fourth floor levels, this bridge spanning a 20-foot public alley. It is thoroughly fireproof, being of reinforced concrete construction throughout, and equipped with automatic sprinkler system connected with elevated tank. This structure is six stories in height, and is 85 feet wide and 150 feet long. Adjoining this new main building in the rear is located the new one-story dyehouse, 65 by 100 feet, also constructed of reinforced concrete.

SPACING FOR FULL FASHIONED KNITTING MACHINES

The new manufacturing building is of the flat slab type of construction, with smooth ceilings unobstructed by beams of any kind. The story heights in the upper stories are 14 feet from top to top of floors, and in the first story the height is about 17 feet. The dyehouse has a height of 18 feet under the beams.

The columns in main building are spaced 21 feet, 7 inches apart longitudinally, and about 28 feet on centers crosswise of the building. This spacing provides for the installation of full fashioned knitting machines. The six-story building is equipped throughout with "Fenestra" steel sash, and on the south side of the building all steel sash ventilators have been arranged to open out and are hinged at the top, so that they present no obstructions to the hanging of curtains. On the north side the ventilators are center pivoted, as it is figured that curtains will not be required here. Glass throughout is of the ribbed variety.

All floors in main building, except the first floor, have a maple top floor, laid diagonally across the building, the ground floor will have a granolithic finish.



NEW SIX-STORY ADDITION TO PLANT OF HOLEPROOF HOSIERY COMPANY, MILWAUKEE

A very complete system of heating and ventilating has been installed, this being one of the Carrier Air Conditioning Co.'s make, and the arrangement presents some interesting features. The main fan room is located above the roof of the six-story building and directly under the concrete trestle supporting the sprinkler tank. In this room are located the heating coils and fan, and also an air washer for washing and purifying all air which will be used in the building.

OTHER HEATING DETAILS

From the fan room a vertical shaft drops through the building, and a return air duct is also run parallel with this for returning air to the fan room. This return air will be rewashed and mixed with fresh air for using over again. On each floor a galvanized iron distributing duct runs down the center of the room on the ceiling with frequent branches, the whole providing for a close and even distribution of fresh air to every part of each floor.

Additional heating coils are located at the point of junction of branch lines with the main duct in each story, and a complete system of Johnson temperature regulation will be installed providing for temperature regulation on each individual floor of the building. The Carrier humidity control will be used in the main fan room on roof. Registers in return air ducts and automatically controlled dampers provide for regulating the amount of return air which reaches the fan for circulation.

Cast iron wall radiators using exhaust steam and equipped with vacuum return system are used for heating in stair tower and in toilet and wash rooms.

Two elevators are installed in this building, also two fireproof, enclosed stair towers, and one outside fire escape.

TOILETS AND WASH ROOMS

A very complete system of toilets and wash rooms, providing the most modern plumbing equipment, has been installed throughout the building, and among other features are included the installation of separate drinking water lines, with water cooler and quartz filters on this line.

In connection with the construction of this large addition, a careful study of the complete plant with the location of departments and the routing of materials

A Modern Lubricant for Modern Machines

The world moves onward—step by step.

New ideas—new methods—new men—*must* be produced to meet the *new demands*.

Just as improved machines are rapidly supplanting outworn types—so is NON-FLUID OIL an improved lubricant that is *replacing* common greases and fluid oils.

TRADE MARK REGISTERED IN
NON-FLUID OIL
UNITED STATES PATENT OFFICE

Fluid oils are wasteful and inefficient. They leak out, drip, spatter and cause oil stains. Bearings require constant re-oiling to keep them from running dry—a loss of time as well as lubricant. Output is cut down because of damage from oil.

Common greases increase friction and waste power. They cannot even start to lubricate until softened by frictional heat, and leave a gummy residue in bearings. This is equally true of so-called "liquid greases."

Leading mills throughout the country have found it possible to get away from the drawbacks of ordinary oils and greases by using NON-FLUID OIL.

NON-FLUID OIL is highly adhesive and will never leak from bearings. With this product the customary intervals between oilings can often be stretched from five to six times—less oil is used, less time spent in oiling and *oil stains are practically eliminated.*

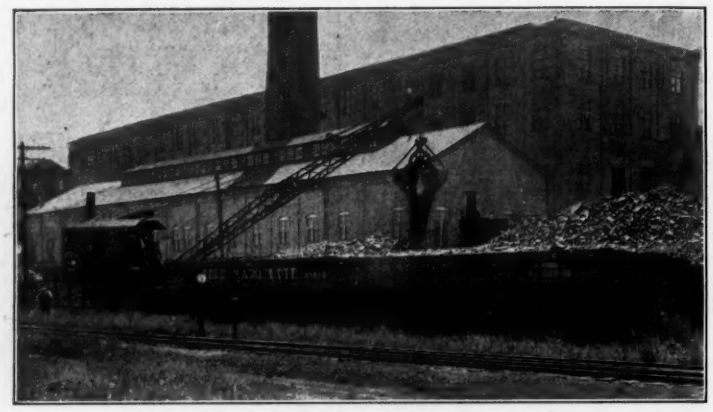
Unlike ordinary greases NON-FLUID OIL lubricates without the aid of heat and leaves no residue in bearings.

Write for descriptive literature and free samples

SOLE MANUFACTURERS

New York & New Jersey Lubricant Co.
165 BROADWAY NEW YORK

Note—NON-FLUID OIL is not the name of a general class of lubricants, but of a specific product originated and produced by us exclusively.



STORING COAL

For Handling Coal

either from cars to storage or into bunkers, a locomotive crane has many obvious advantages. Most important of these is the saving of time and labor made by substituting tireless mechanical energy for hand labor. In addition to bucket work, a locomotive crane is, of course, available for lifting purposes and for switching freight cars.

INDUSTRIAL WORKS LOCOMOTIVE CRANES

are in general use at up-to-date manufacturing plants to increase profits by reducing handling costs. Have you investigated their possibilities at your plant?

The great demand for high grade locomotive cranes has forced deliveries of Industrial Works Cranes well into the future. It is for this reason we give a friendly warning to those who may want a crane for use next summer. Place your order now; anticipate your requirements. Do not delay and then have your imperative demands for prompt delivery force you to buy inferior equipment. Get the most for your money by ordering now. With prompt order we can still make delivery early in the summer.

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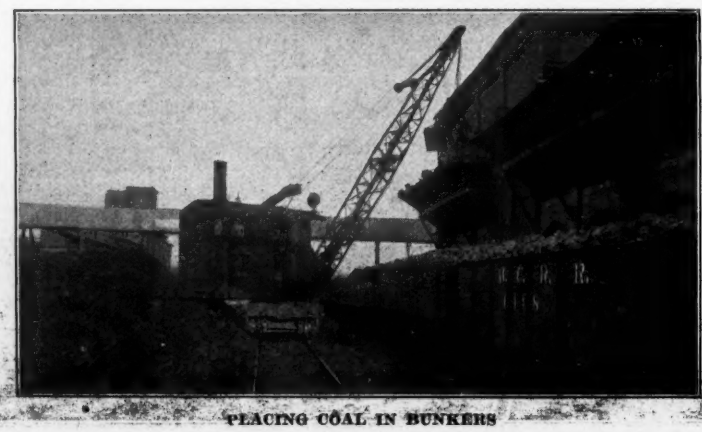
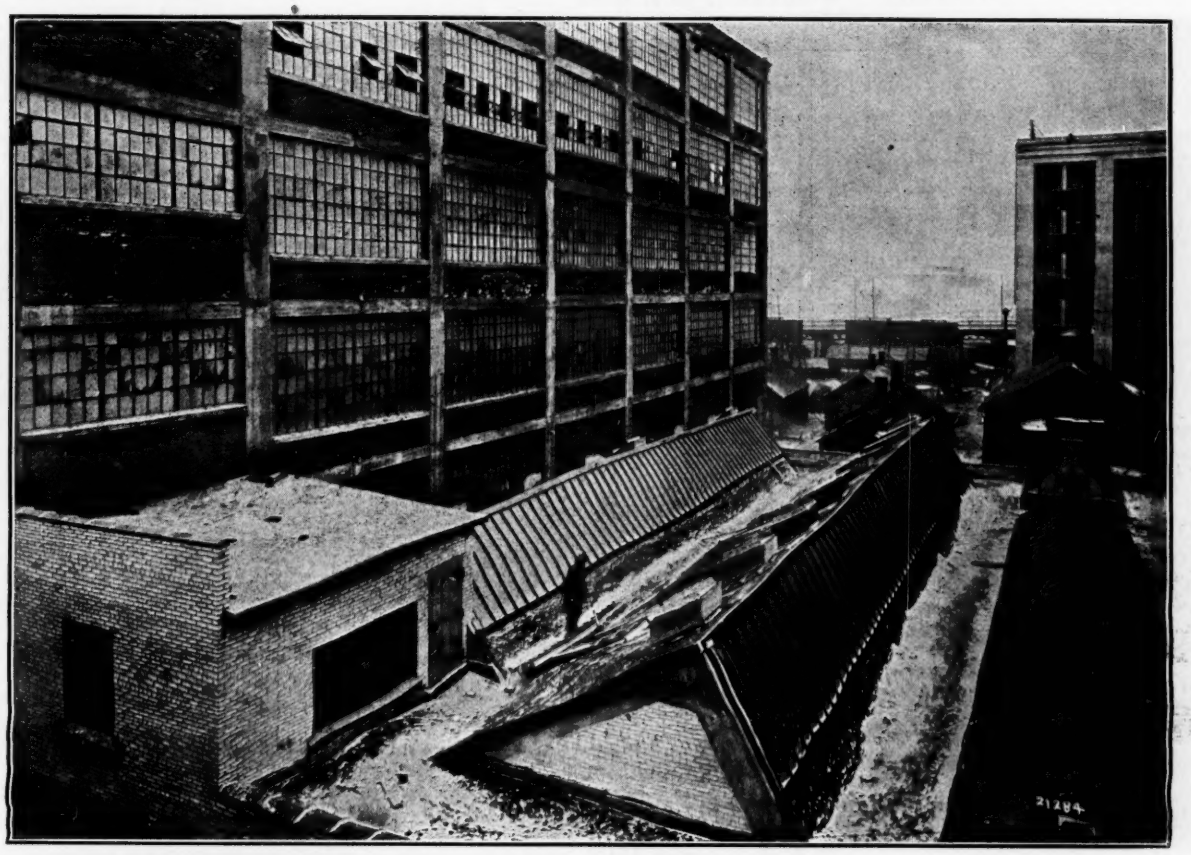


PLACING COAL IN BUNKERS



REAR VIEW OF HOLEPROOF HOSIERY COMPANY'S NEW SIX-STORY BUILDING. ROOF OF NEW ONE-STORY DYEHOUSE IN FOREGROUND

was made by the engineers and owners, and an arrangement was worked out which provides for a rearranging of departments and of machinery which works out this problem in the best manner, considering the use of this new building in combination with the other buildings of the company.

PARTICULARS OF DYEHOUSE

The one-story dyehouse adjoining the main building presents a number of novel features which are interesting. The construction is fireproof throughout, with concrete skeleton and concrete roof slab. The walls are of brick, built in between concrete columns, and the slab between beams is 4 inches in thickness and is covered throughout with a 2 inch layer of cork to prevent condensation on the roof. This is further covered by a 4-ply asphalt roof.

The sawtooth skylights are equipped with hollow metal sash, which is double glazed, a generous air space being provided between the two thicknesses of glass. A close spacing of the outlets on the roof has been provided, and these will be equipped with the best type of ventilators.

The heating and ventilating of this room is of particular interest and will be provided for by the fan system, the apparatus being located in fan room on the roof of the dyehouse building. At this point a large fan and heating coils are installed, with capacity for a six-minute air change in the room.

A vertical shaft carries the air down from the fan through the corner of the dyehouse and to the floor level where it connects with a tunnel and distributing system under the floor. The main tunnel is of concrete and branches from same are run with vitrified sewer tile. The air is brought in at close intervals from under the floor, and a number of metal outlet boxes provide for the introduction of warm, dry air into the room at a height of about 18 inches above the floor. This warm, dry air will absorb a part of the steam which results from the processes, and will displace the balance of same due to the rapid air change.

MACHINERY OVER TRENCHES

So far as possible all dyehouse machinery will be of the enclosed type, and all vats will be provided with hoods and direct piping through roof.

The floor construction presents another interesting feature, as there are two trenches each 3 feet in depth, one 8 feet wide and the other 20 feet wide, both extending the entire length of the building directly under the sawtooth skylights. Each trench has a gutter down the center or drainage, and will be floored over at the main floor level with square-edged plank laid with open joints, thus providing for rapid drainage for any water which may accumulate on the floor. This plank will be waterproof before laying.

The layout has been planned so that all machinery or vats will be set directly over these trenches, and the working space around the same will be on the plank floor above referred to, which is on a level with the main floor. The balance of the dyehouse floor will be a mastic asphalt floor having a pitch to the drainage trench above referred to.

Practically all machines will have individual motor drives, so that there will be very little shafting in connection with the installation, and as there is no inflammable material in connection with the construction it has been found possible to omit the sprinklers.

All wiring is in metal conduit imbedded in concrete, and all piping will run below the plank floor above referred to, so that there will be an almost entire absence of pipes, wires, shafting or other obstructions on the ceiling of the room.

The sawtooth skylights provide the best of light, and with the arrangement for drainage, and the heating and ventilating, as above referred to, it is believed that this will present a model dyehouse for hosiery.

The arrangements for handling the work in the new building are as follows: Yarn previously wound in the old buildings will be brought through the bridge on the fourth floor and ribbers and knitting machines will be located on the fourth and third stories of new building.

HOW WORK IS HANDLED

After knitting is finished on these floors, the work will be dropped down metal chutes to the second floor, where the looping room will be located. From the looping room goods will be again dropped to the first floor where they will go into a storage room of undyed stock immediately adjoining the dyehouse. From here the work will be taken into the dyehouse, and after dyeing will go back into the main building to the dry room located on the first floor.

A complete installation here of Paramount metal forms, using the latest type tables, will provide for the drying and pressing of the goods, and upon leaving this department they will be taken up an elevator to the third floor, through the bridge into the present building, where the packing, finishing and storage department will be located.

The fifth and six floors of the new building will be used for the manufacture of full fashioned hosiery, and for the manufacture of silk cloth used in gloves and underwear also manufactured by the Holeproof Hosiery Co.

A large "Permutit" water softening and filtering plant will be installed in connection with new dyehouse, and a modern drug room and laboratory will also be constructed.

The general contractor on the construction of the building is Walter W. Oeflein, of North Milwaukee, Wis., and the plans for the new building, including the mechanical equipment and machinery layouts, were prepared by the Chicago office of Lockwood, Greene & Co., Engineers, who are also supervising the construction and installation of equipment.

New Addition to the Duplan Silk Company

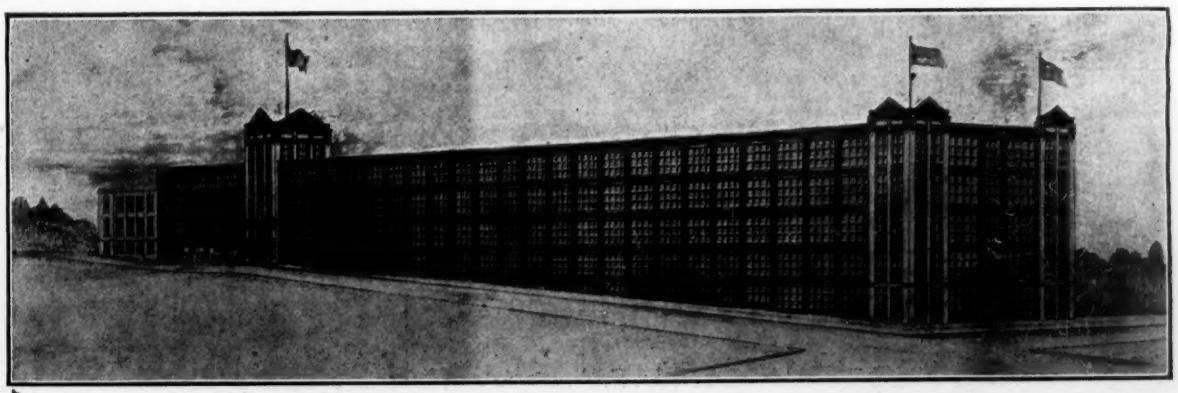
300,000 Square Feet Additional in a Solid Block 700 Feet Long

AT the end of the year 1917 the Duplan Silk Co., of Hazleton, Pa., has completed its immense addition to the plant bordering Spring street and Fulton Court, connecting Mill No. 3 and Mill No. 5 with the new addition.

In order to meet the increased demand for their products and provide the most efficient routing and production arrangements, the company decided to utilize the ground bordering the eastern section of its plant, and erected a new three-story, basement and sub-basement, reënforced concrete, brick-paneled building, 700 feet long, part of which is 110 feet wide, providing ideal facilities for silk manufacture.

This new building may justly be called an all-daylight construction, having windows on three sides, providing 80 per cent. glass surface. The interior of the mill is of standard concrete construction, with columns 16 feet high and white interior finish.

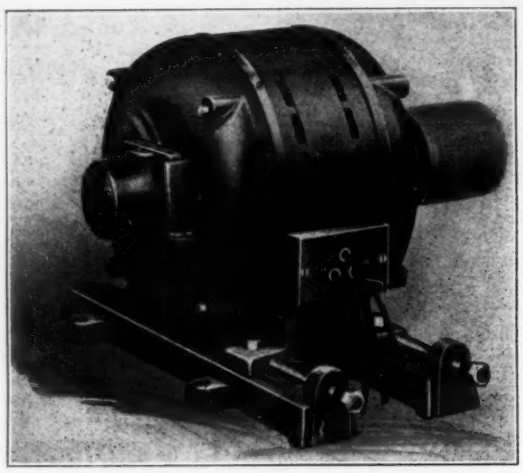
Extreme precautions have been taken to prevent dew forming, the walls having double insulation, the windows, double frames, and double glass, besides the installation of the Carrier system of air conditioning through which the



NEW ADDITION TO THE PLANT OF THE DUPLAN SILK CO., HAZLETON, PA.

HOWELL
Polyphase Motors

Equipped With Patented Rotor Re-Centering Bearings



HOWELL Induction Motors are designed and built to give the greatest mechanical reliability, insuring the operator against the possibility of shutdowns. Together with extreme care in mechanical design and workmanship, have been combined the most skillful electrical designs, so that the power factor, efficiency and overload capacity, have in no way been sacrificed in obtaining the mechanical reliability of the motor; consequently these motors are mechanically strong and rugged, are very efficient and have liberal overload capacities; they are long lived, inexpensive to maintain and will operate continuously with practically no attention, requiring only an occasional inspection of the oil reservoirs to see that they contain sufficient oil.

Induction Motor Specialists

The policy of this company, is to limit itself to the field of polyphase induction motors; thereby concentrating every effort to make one line of motors and to make that line absolutely the best that the highest engineering ability, together with skilled workmanship, and the best material can produce.

HOWELL Motors are wound for operation on 110-220-440 and 550 volts, two and three phase circuits of all commercial frequencies, and standard speeds.

Guarantee:—All HOWELL motors are guaranteed to carry their rated load continuously with a temperature rise above the surrounding air not to exceed 40 degrees centigrade, and 25 per cent overload for two hours with a temperature rise not exceeding 55 degrees centigrade. We further guarantee all HOWELL Motors, when operated under normal and proper usage, against mechanical or electrical defects for one year from date of sale, and will repair or replace, free of charge, if returned prepaid direct to us, the manufacturer, any apparatus showing inherent defect.

Howell Electric Motors Company

GENERAL OFFICE AND FACTORY

HOWELL, MICHIGAN, U. S. A.

45 Cotton Mills Increased their Production with *Cork Insert Spinning Frame Pulleys*

Over 1800 Spinning Frames from North to South Are Now Prepared For More Efficient Service

YOUR production losses cost you three times as much as they did with 10 cent cotton. You don't need to be told how labor and supplies have advanced.

Fortunate were the mills who for one or more of the following reasons equipped their spinning frames with Cork Insert pulleys. They are now prepared to meet to-day's exacting demands for production.

These are some of the mills:

Sagamore Mfg. Company, New Bedford Cotton Mills Corp., Acushnet Mills Corp., King Philip Mills, Sharp Mfg. Company, Globe Mill of the Manville Company, Blackstone Mfg. Company, Milstead Mfg. Company, Pendelton Mfg. Company, Edna Cotton Mills, Saxe-Gotha, Graniteville Mfg. Company.

Here are some of the reasons why they installed Cork Inserts:

They increase power-transmitting capacity of the drive.
They run satisfactorily with slack belts.
They increase the life of the belts.
They reduce the time required to keep the belts at the proper tension.
They lessen the wear on the bearings.
They do away with the trouble caused by oil getting on the belts.
They give the same speed on a wet Monday morning as on a clear Wednesday afternoon.
They do away with the belt dressing, with its trouble, its muss and its damage to the belts.
They deliver every ounce of yarn that the frame is capable of making.
They give a uniformity to the yarn that cannot be expected if speeds vary.

How About the Production of Your Frames?

Cork Inserts offer the simple and economical means of getting the *full* production from your frames. You can equip your present pulleys a few at a time at small cost in your own shop without losing the use of the machines. Write us to tell you about it.

THE CORK INSERT COMPANY

160 Federal Street **Boston, Mass.**

air will be properly washed and conditioned in all seasons of the year.

The ground occupied by this new section has a considerable grade, making at the Spring street end practically a five-story building. With the increase of the grade at about 350 feet of the building's length, the sub-basement is discontinued and the building carried on as a three-story and basement building. The two towers facing Spring street contain the fire escapes, with cement stairs, dividing railings, and safety treads. It also houses the comfort rooms. A third tower, facing Fulton Court, has, besides fire escapes and comfort rooms, the elevators, while at the angle joining the No. 5 mill to this new construction another fire escape and elevator were constructed, providing the mill with emergency escapes on practically four sides.

All cement floors of this new addition have hard wood coverings, and it is expected that the warping and weaving machinery installed in this section will have the full advantages of elasticity and floor yielding capacity of standard mill construction. Direct and indirect heating has been adopted throughout the plant, while for illumination individual drop lights with buried wire connections have been planned.

ENLARGED EMLOYES' BUILDING

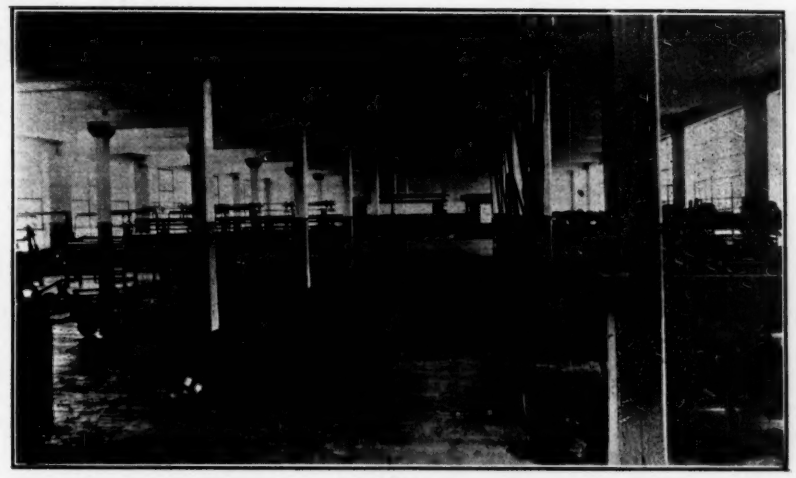
Besides manufacturing purposes this mill will also provide additional floor space for the "employes' building," utilized partly as a locker room and partly as a lunch room, besides housing the continuation school under organization. The new lunch room will provide a seating capacity for over 1,500 employes, and is furnished according to the highest demands of cleanliness, with Vitrolite top tables and the latest style of coffee urns and cooking utensils. It was found advisable to divide the lunch room into sections for the men and women employes. For the men employes a pool table will be installed.

The new school room will be under the management of the local school organization and will provide additional facilities planned according to the Gary system for the young workers of the mill. In this institution, silk machinery representing all the various processes will be installed in the school. The schedule of vocational education will include practical lectures and demonstrations of all branches of manufacturing carried on at the Duplan plant.

The new building will also immensely increase the locker room facilities of the mill. All lockers, about 2,000 in number, are located in one section.

The planning of the locker room needed extreme care to prevent congestion during the morning and evening hours. This locker room has only one main entrance, and it has been arranged in such manner that the employes engaged in the farthest section of the plant use the last section of the room, so that when they reach their lockers the nearest ones have already left the building, eliminating confusion and congestion.

Lockwood, Greene & Company, of New York, are the engineers, while the building operations have been carried on under the supervision of Mr. J. B. Chamberlin, the construction engineer of the Duplan plant.



WEAVING AND WARPING ROOM, HORN BROS. WOOLEN CO., LTD., MACHINERY BEING INSTALLED

A New Canadian Woolen Mill

Horn Bros. Woolen Co., Ltd., Built Modern Mill to Replace Burned Plant

ABOUT three years ago, the Horn Bros. Woollen Co., Ltd., manufacturers of woolen goods, lost their plant at Lindsay, Ontario, by fire. The illustration shows the new mill recently completed and equipped for manufacturing blankets and hand knitting yarns. The mill is 60 x 125 feet, three stories high, and is of mill construction, slow-burning type. The architects were T. Pringle & Sons, Montreal and Toronto.

CONCRETE WALL TO SECOND FLOOR

There is a heavy concrete wall extending to the second floor. On this are the bricks laid in cement mortar. The first floor, or basement, is concrete and is used for finishing. The second and third floors consist of 2 x 5 eastern spruce laid on edge covered with maple flooring, making a solid floor 6 inches thick. The ceilings are 13 feet high.

As may be seen by the photographs, the window area is large and ample provision is made for ventilation. The walls and ceilings are painted white, consequently the rooms are airy and bright. All wiring is run in conduit. Each flat is lighted with thirty-two 100-watt lamps, which give a brilliant glow over the entire plant. The power to operate the machinery is electrical, which is furnished by power from the company's own steam power electrical plant, or current can be obtained from the Ontario Hydro Power Co.

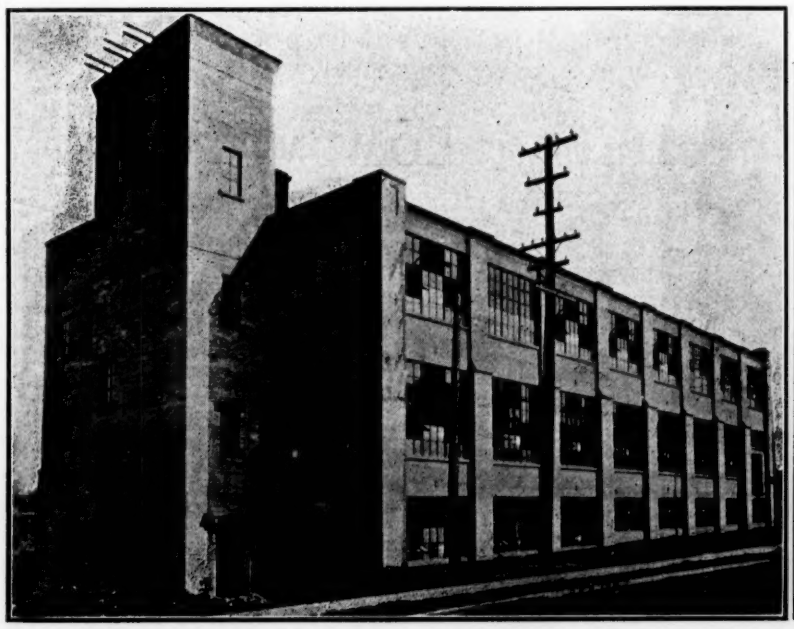
The machinery is driven by motors in groups; for instance, in the mule department one motor supplies power for two mules, etc. The machinery is all new, and was supplied by the Davis & Furber Machine Co., North Andover, Mass.; by John Heathcote & Son, Providence, R. I.; by James Hunter Machine Co., North Adams, Mass., and by the Parks & Woolson Machine Co., Springfield, Vt.

ROUTING THE MATERIAL

The wool is received in the dyehouse, which adjoins the new building, and is first run through a cone duster. It is delivered from the dryer ready for the picking department. After being prepared and oiled by a Fearnought picker, the material is elevated to the carding and spinning room on the third floor in large box trucks. After carding it is placed on spinning mules, and from there is taken in bobbin trucks down the elevator to the weaving room, and from there lowered into the basement, where it is finished, cased or baled and shipped.

The interior view was taken on the second floor when machinery was being installed and shows the weaving and warping room. The doors shown at the further end open into the tower where the stairway, lavatories and power elevator are located. These are all cut off from the main building by automatic roller fire-proof doors. The tower shown at the left of the exterior view is constructed for a tank to supply water for the sprinkling system.

With new machinery, and a building of solid construction, the results obtained are described as marvelous by the company, who state that it is a pleasure to operate a plant under these conditions.



HORN BROS. WOOLEN CO., LTD., LINDSAY, ONTARIO

The Lackawanna Mills' Enlargement

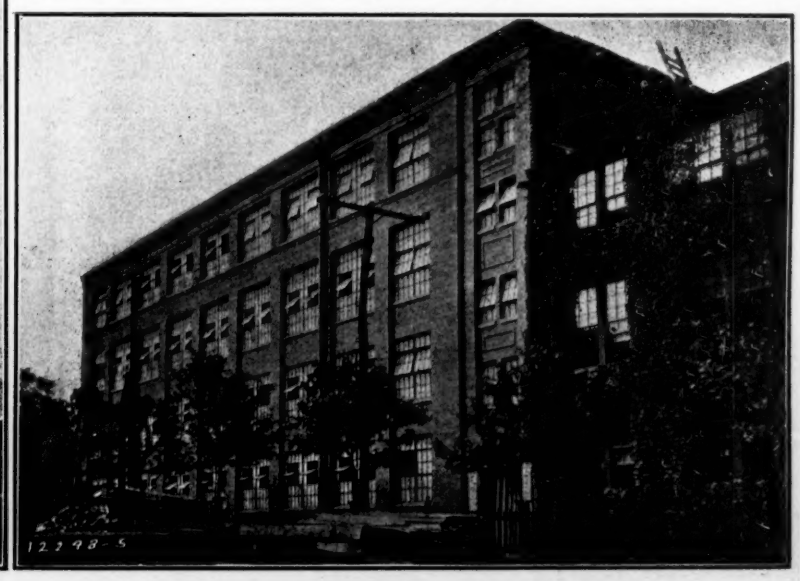
New Mill and Additional Story on Older Building

A RECENTLY completed addition to the present buildings of the Lackawanna Mills, Scranton, Pa., adds a new four-story and basement building, 88 x 120 ft., and an additional story 48 x 120 ft. to one of the present buildings.

The new building is of standard mill construction and is thoroughly modern in all respects. Steel sash, fire doors, sprinkler system and elevator are of the latest type. An interior finish of high grade white enamel paint, in connection with ample window area, makes an attractive and bright appearance in each of the four stories.

The exterior of the building is laid up with Nay Aug brick, with Petersburg stone ashlers for the basement.

Westinghouse, Church Kerr & Co., Inc., New York City, are the architects and engineers for the mills.



NEW BUILDING FOR LACKAWANNA MILLS, SCRANTON, PA.

The Kind of Fuel Doesn't Matter

Mine Run—Slack—Culm—Sweepings—Anything that will burn.
With Balanced Draft you can get all the heat.
Balanced Draft assures these combustion fundamentals. It:—

Measures the right amount of air for perfect combustion;
Provides the right opening for the escape of waste gases;
Prevents outside air from diluting the heat.

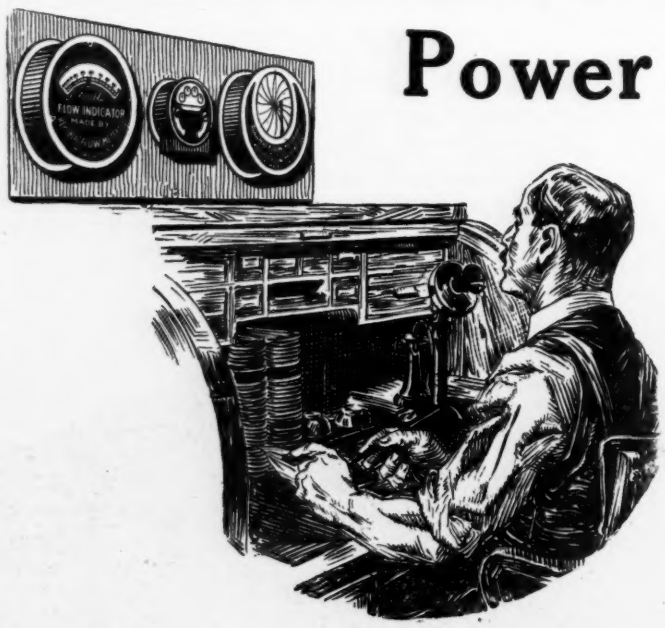
With any Fuel—with any load

Balanced Draft

Saves Fuel and Increases Boiler Output

THE ENGINEER CO.
17 BATTERY PLACE, NEW YORK

Also Sole Builders of the Turner Baffle Wall.
A Permanent and Tight Boiler Baffle.



Power Costs at a Glance

That's what you get with the Republic Flow Meter.

The cost to operate one boiler—the cost to operate a dozen. An accurate check on each boiler—each made to bear its share of the load.

It gives you also the amount of power used by each department, supplying you in this way the basis on which to pro-rate your power charges among the several power using units.

REPUBLIC FLOW METER

The meter body may be placed at any point on the line, while the recording instruments may be placed in your own office, with the record of results instantly available. Certainly, here is EFFICIENCY, and a measure which saves its cost over and over again in conservation of coal.

Meter bodies may be placed on the lines running to each power-using department. An accurate record of the amount used by each is supplied. No department is charged for more power than it uses. Each department is charged for all that it uses. Greater efficiency throughout the entire plant is the result. Our bulletin No. 12 describes the Republic in detail. Send for a copy of this interesting book today.

REPUBLIC FLOW METERS COMPANY

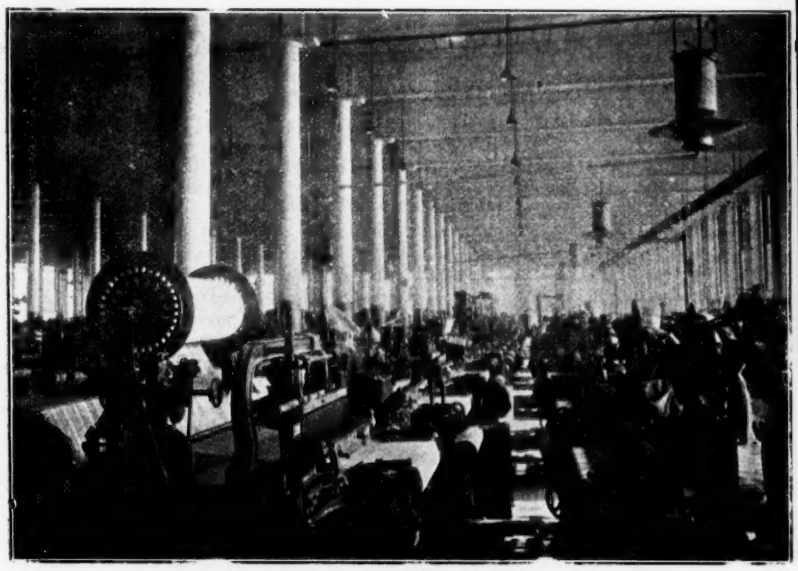
565 Washington Boulevard, Chicago, Illinois

New York Office, 42nd and Broadway, 602 Longacre Building

New Mill and Rearrangement of Departments

Muscogee Manufacturing Co., Columbus, Ga., Builds No. 5 Mill — Doubles Machinery Equipment

THE erection of Mill No. 5 of the Muscogee Manufacturing Co., Columbus, Ga., makers of colored cottons, tickings, towels, yarns, etc., was completed early in the year. This new building is located at the upper end of Broad street, the main business street of Columbus, at the corner of Broad and 14th streets. To provide for its erection the Muscogee Manufacturing Co. had to move three nice residences to a lot owned by them immediately across the street. After this was accomplished construction work on the building was commenced.



THIRD FLOOR, MILL NO. 5, MUSCOGEE MANUFACTURING CO. WEAVING DEPARTMENT MOVED TO NEW BUILDING FROM MILL NO. 4

On account of the grade of the street, the east end of the first story is about 12 feet below the Broad street level, but the drive and main entrance on the west end is very nearly at the street level at that point.

STANDARD MILL CONSTRUCTION

Mill No. 5 is standard mill construction throughout, with ceiling 16 feet high, with wood columns and steel floor beams. The top floors throughout are finished with a good grade of maple flooring. The outside brick construction is straight-faced mill work, with clear glass windows. Mill No. 5 is 105 x 205 feet, outside dimensions, and five stories high.

On the north, and connecting with this building, is the bleachery and dyehouse, 51 x 150 feet, and two stories high. On the first story is located the inner court and driveway, shipping section, machine shop and incidental storage space. There are three floors equipped for weaving. On the top floor is located the beaming, warping, slashing and spooling departments. On the east side, divided by a partition brick wall, is the cone and tube winding department.

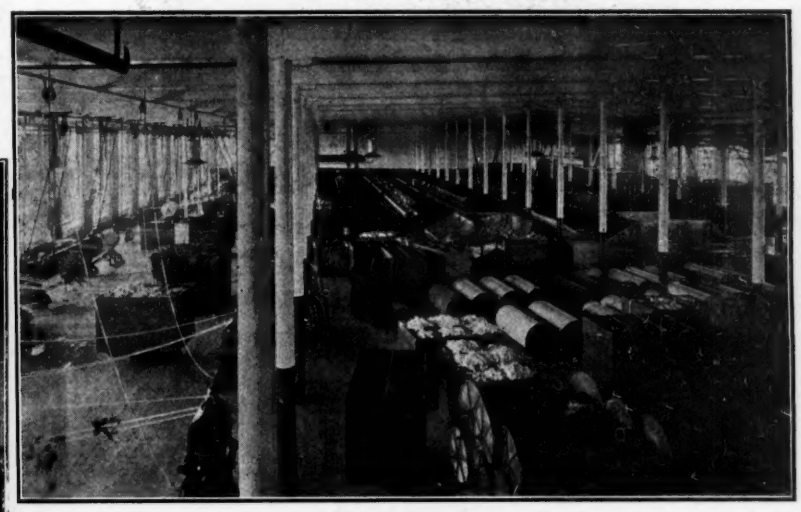
The level of the floors of Mill No. 5 correspond to the floors of Mill No. 4, and these two large buildings are connected from the top story by a steel-covered bridgeway, 125 feet long. Mill No. 4, to which reference is made, was built in 1904, and is 105 x 277 feet, five stories high. The entire plant, including Mills Nos. 1, 2 and 3, is connected by a convenient arrangement of bridges and passageways.

EXTENSIVE MACHINERY CHANGES

The machinery changes necessary to make these improvements were very extensive. The following machinery and departments had to be removed from Mill No. 4 into Mill No. 5; dyeing department, weaving department, slashing, spooling, warping and beaming. Mill No. 4 was then converted exclusively into a complete spinning mill, with the opening and picking departments on the first floor, carding departments on the second and third floors, and spinning departments on the fourth and fifth floors.

The movement of the product is from the top floor of Mill No. 4 to the top floor of Mill No. 5 in the shape of finished yarn to be used in the various processes of converting into finished goods and yarns for the market.

Both Mill No. 4 and new Mill No. 5 are completely equipped with new and up-to-date machinery, including humidifiers, heating and ventilating systems. There were added 23,000 spindles with the accompanying machinery, making a total of 51,264 spinning spindles, 600 looms, 1,350 cone and tube winding spindles, 2,700 twister spindles.



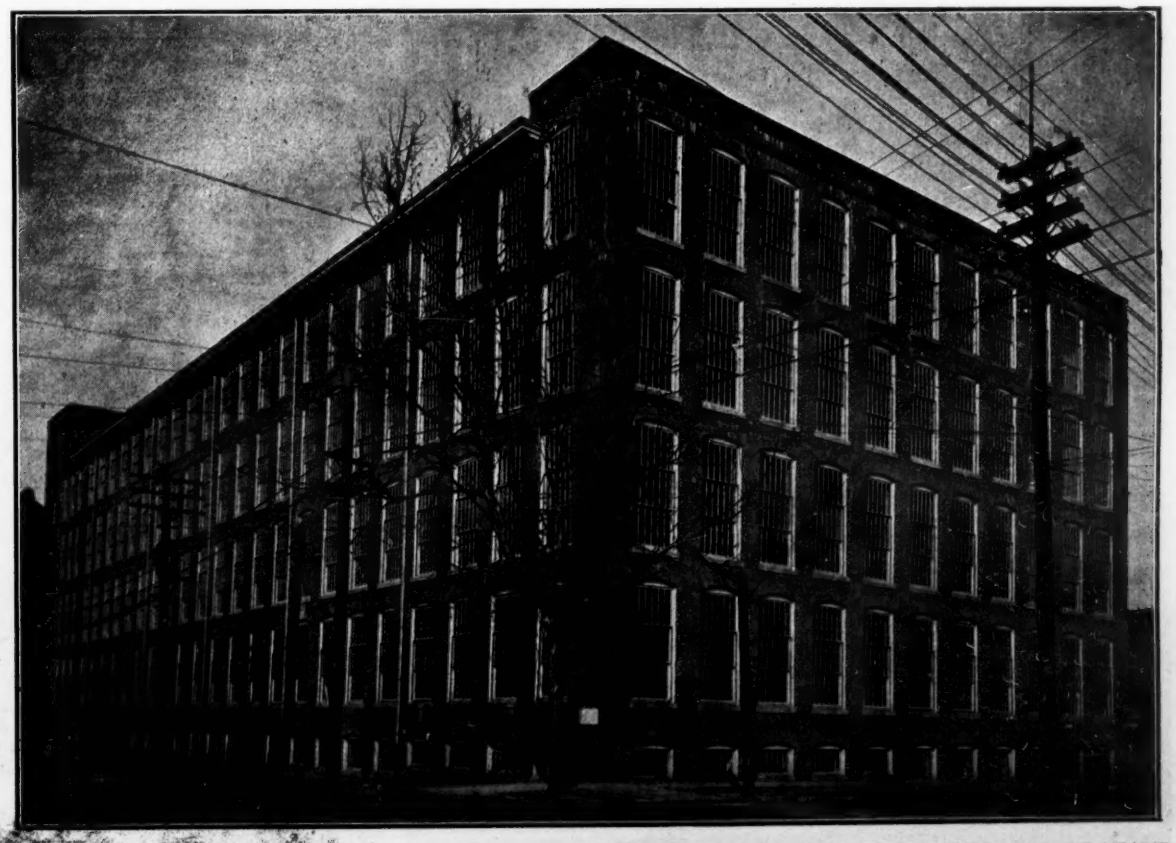
BEAMING, WARPING AND SPOOLING DEPT., MUSCOGEE MANUFACTURING CO., MOVED TO NEW BUILDING FROM MILL NO. 4

PURCHASE ELECTRIC POWER

The entire plant is operated by electric power, furnished by the Columbus Power Co., and the system adopted consists of group drives for the various departments and four frame motor drives in the spinning department.

About one-half of their production consists of tickings, towels and colored goods, and the other half consists of yarns for the market, on cones, tubes and in skeins, single and twisted, white and mixtures. The company sells all their goods direct through their own salesmen and direct representatives. The total cost of the improvements and additions was about $450,000. E. W. Swift is president of the Muscogee Manufacturing Co., and J. P. Kyle is secretary and treasurer.

The new mill, which is now in operation, gives a largely increased output which the growing demand for goods made necessary, and provides manufacturing economies in the better handling and routing of materials.



MILL NO. 5, MUSCOGEE MANUFACTURING CO., COLUMBUS, GA., WHICH PROVIDES FOR A REARRANGEMENT OF DEPARTMENTS AND A LARGE INCREASE IN EQUIPMENT

Does Your Fuse Investment Represent an 80% Waste?

When the so-called "one-time" fuse blows, it must be thrown away. Actually the only part of the fuse that has been damaged is the thin filament within. The outer shell, which is unharmed, is, therefore, wasted.

ECONOMY
renewable
FUSES

are not thrown away when they blow, but are restored to their original efficiency by inserting a new "Drop-Out" Link. These links are inexpensive and a stock on hand represents but a small investment. The outer shells, like the brook, "go on forever."

Thousands of plants of all descriptions are equipped with Economy Fuses. Uncle Sam uses them on submarines and warships—a sure proof of their quality, safety and dependability. Economy Fuses have actually saved these users 80% of their former fuse bill.

You can make your next fuse investment a permanent one by specifying—"Economy." Catalog and samples to fit your circuit sent on request.

ECONOMY FUSE & MFG. CO.
Kinzie and Orleans Sts. Chicago, Ill.

Sole Manufacturers of the
"Arkless" Standard Indicating Fuse

KING MILL WHITE

"More Light" Will "Save the Day"

More Light will help to solve your present problem of producing more goods with a smaller working corps. It will make each man a better worker—a bigger producer.

Get this additional light by painting your walls and ceilings with KING MILL WHITE. This paint will reflect the light back to the machines instead of permitting it to be soaked up by the walls.

KING MILL WHITE gives surfaces a pure-white, permanent and sanitary finish, that will not turn yellow or chip off.

Remember—a contented employe is a business asset. Make your men more cheerful by giving them a bright King-White room. Write for free sample to-day.

The Chicago White Lead & Oil Co.
15th Street and Western Avenue, Chicago, Ill.

The largest, cleanest, most efficient paint factory in the West

Reorganization of Winnsboro (S. C.), Mills

Erect New Buildings and Remove Old Weave Shed and Storehouse

IN order to increase the capacity of the plant to three million pounds of tire fabric per year, the Winnsboro Mills, at Winnsboro, S. C., last year trebled the size of the existing mill by the erection of an extension to the mill proper, and a new weave shed, picker building and storehouse. The old weave shed and storehouse were abandoned and removed.

This work naturally involved the complete reorganization of the old mill and its machinery, so that the plant today, as designed by Lockwood, Greene & Co., engineers, is practically a new productive unit. Not only was old machinery rebuilt or replaced, but the old building itself was altered by the erection of new stair and toilet towers, by the installation of a new heating system, as explained later, and by the installation of new top floors throughout.

The original mill building was 75 feet by 355 feet, with three stories for half the length and two for the remainder. The new extension is 103 feet wide and 366 feet long, three stories high. The end wall of the older building was removed, so that the mill now functions as one great building, over 700 feet long. In this structure all the manufacturing processes from carding to beam warping is carried on.

Such old machines as were suitable and in good condition were retained for further service. Other machines were rebuilt and modernized, while those which were in the worst conditon were scrapped. The layout of the departments and machinery is such that a large increase in production can be made within the limits of the new buildings.

The new weave shed is a structure 101 feet by 180 feet, placed at right angles to and at the end of the mill so as to form a continuous operating unit. This building is now only one story high, with a monitor roof, but has been designed to be eventually three stories. It is equipped throughout with 60-inch extra-heavy looms of Crompton & Knowles make.

In the exterior angle between the weave shed and the mill there has been built a clock tower, 105 feet high, to form the main entrance to the plant. It has four 10-foot clock dials, operated by a Seth Thomas clock mechanism, and a well studied treatment of openings and brickwork with stone trimmings has produced an imposing tower. This tower contains a stairway and locker rooms for the mill.

NEW PICKER BUILDING

The picker building, built adjoining the weave shed and parallel to the mill, is three stories high, 81 feet by 118 feet, with the opening and picking operations carried on the second and third stories. The dust room occupies half the first story, with the cloth shipping and waste shipping rooms in the other part. Manufactured goods are shipped as fast as carload lots are made up, so very little storage space is required for cloth.

As all cotton used is imported stock, Government regulations with regard to screening and dust disposal have been rigorously followed throughout the picker building.

The storehouse forms an extension of the foregoing building and is 162 feet long with a fire wall in the center. It has four stories and a basement, with elevator service to top floor of picker building. At the north end of the upper story, the sampling room has been fitted up with large plate glass windows.

HEATING AND VENTILATION

All the manufacturing buildings are heated, ventilated and humidified by the forced air system. One new fan house takes care of the original mill building, while a larger structure furnishes conditioned air for the remainder of the plant. Vertical brick ducts were placed on the outside of the buildings fed by concrete ducts running underground. All machinery is electric driven from purchased power.

The work of building the extension to the mill involved the removal of a number of cottages, so it was decided to build a new village on a hill across from the mill and move or rebuild all present cottages. The new site has been laid out with winding streets, and the proposed new structures include an inn, a store, church, school and garage, while later a hospital will be added. Playgrounds, a swimming pool, garden plots, and all other features of a model and modern community are included in the plans for the village. The sewer, water and electric lighting systems are modern and adequate in every way.

A New Southern Underwear Mill

Lockers, Lavatories and Dining Room for Employes

THE Signal Knitting Mills, Chattanooga, Tenn., have built a new underwear plant to manufacture women's fleeced underwear and union suits. A well arranged brick mill has been constructed and there is no rehandling of goods from the time the yarn comes into the mill until the finished product is put into the car. The finishing room is 60 x 250 feet, well ventilated and light, and there are no posts. For artificial light general illumination is used, with large nitrogen lamps on the ceiling, equipped with reflectors which give a good, even illumination. The machinery is driven by electric power in group drives.

LOCKERS AND LAVATORIES

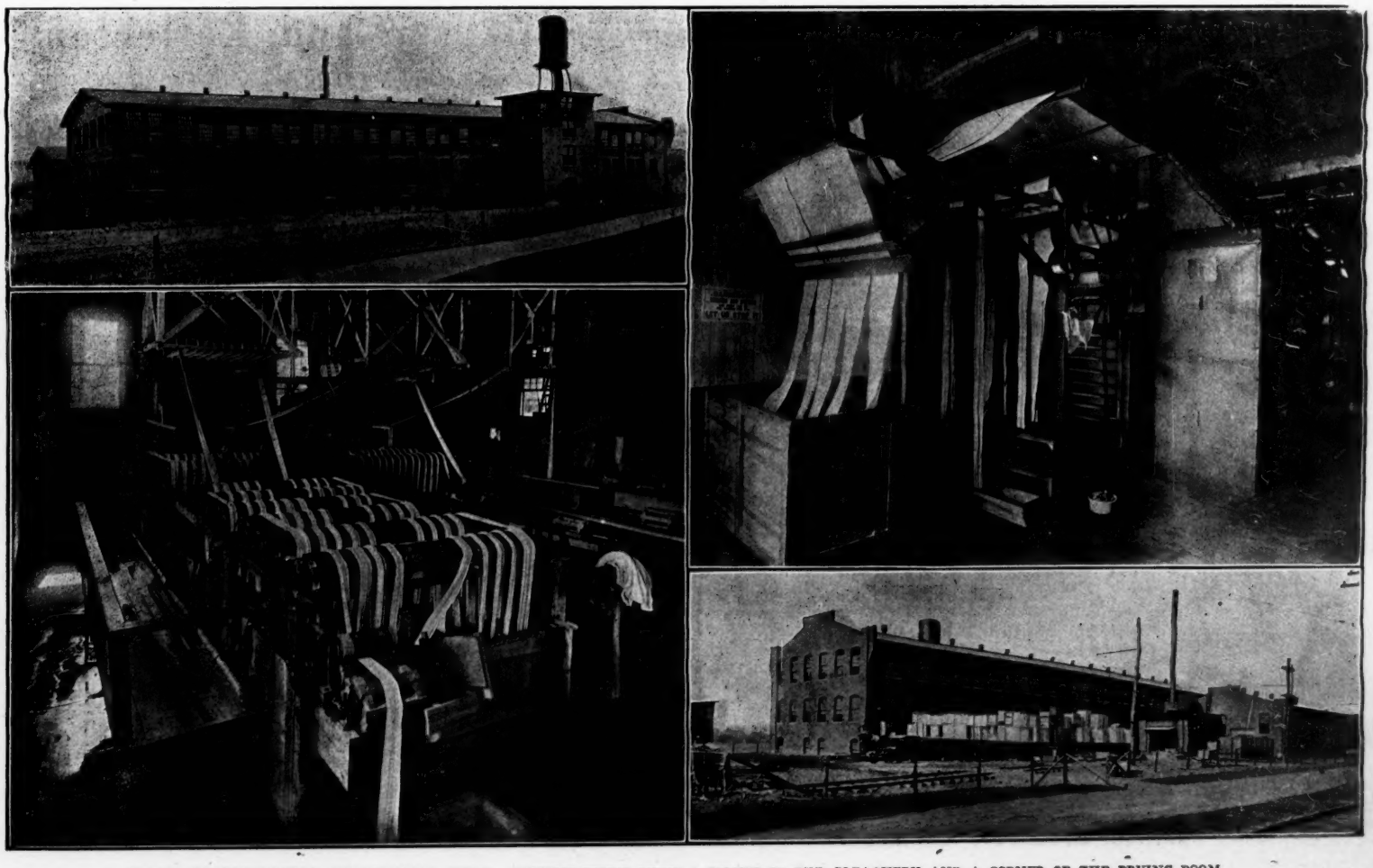
Careful attention has been given to the convenience of the workers and lockers and lavatories are supplied. A large dining room is also maintained on the first floor of the mill, where hot lunches are served. This has proved to be quite a success and the manager believes that it puts the workers in condition to do a better day's work than where they are forced to eat a cold lunch. The lockers and lavatories, supply room and dressing rooms are located in the tower, shown in the accompanying illustration.

ARRANGEMENT OF DEPARTMENTS

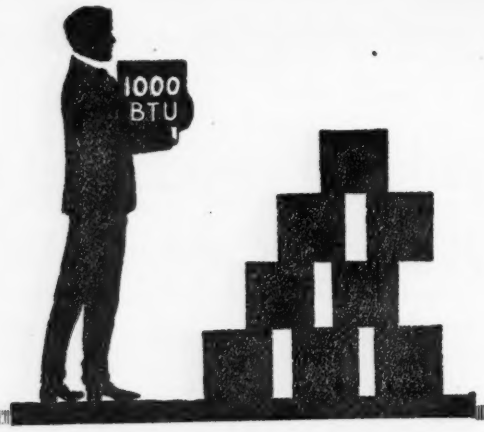
The main mill is 60 x 250 feet with three floors. The top floor is used as a finishing room; the second floor for knitting, cutting and shipping; and the first floor for storage and dining room. The accompanying photographs show the excellent shipping facilities; a corner of the bleachery, which occupies a total space of 50 x 125 feet, and a corner of the drying room.

Operations were started early in the year. The company has capital stock of $150,000; H. M. Evans is president, W. A. Jones, secretary and treasurer; Floyd M. Murphey, manager, and William Murphey, superintendent. Condit & Arnold, Indianapolis and New York, are the selling agents.

The company is experiencing an excellent demand for its products and with a modern mill, progressive management and efficient organization of workers, *faces the future with bright prospects.* The location chosen provides opportunity for expansion as the business on present lines grows or new lines are added.



SIGNAL KNITTING MILLS, CHATTANOOGA, TENN. INTERIOR VIEWS SHOW A CORNER OF THE BLEACHERY AND A CORNER OF THE DRYING ROOM



Store Up Your Heat Units for Future Use

Make every pound of coal give up its full share of heat.

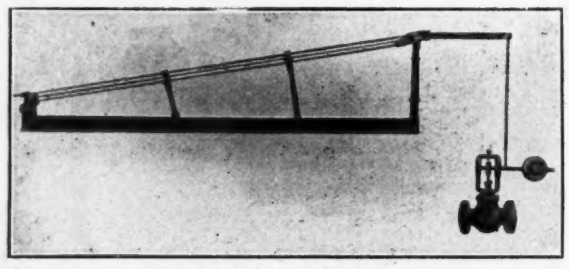
Save those heat units now being wasted up your stack each time the load drops off suddenly by storing them up for future use when the heavy load or sudden pull comes on.

You can do this if you equip your boilers with

COPES BOILER FEED REGULATORS

which automatically maintain a continuous graduated rate of feed that is proportional to the boiler load.

The "COPES" operates in the logical and scientific way. When a sudden load comes on it **decreases** the rate of feed in order that the furnace heat may be utilized for **generating steam.** When the safe economical low level for that load has been reached, the feed is automatically regulated to equal the boiler output.



As the load falls off, the "COPES" automatically increases the rate of feed to a permissible high water level. The surplus furnace heat is therefore readily absorbed and stored in the relatively large volume of water in the boiler and becomes immediately available for steam making when the next heavy demand occurs.

This method of feeding insures constant steam pressure under varying load and increases boiler capacity.

More uniform furnace conditions are established and large savings in fuel compared with hand regulation or constant water level type feed regulators are certain.

The "COPES" is the acme of simplicity. It contains no diaphragms, springs, floats or delicate parts.

You owe it to yourself and your plant to get our book "Scientific Boiler Feeding." Just drop us a postal and it will be sent you.

Northern Equipment Co.
ERIE, PENN.

Take the Glare out of the Light and Watch Production Grow

Not merely plenty of light, but plenty of the *right kind* of light is what the men need.

The "raw" light of modern illuminants is too glaring for the eye; it must be "made over" into a soft, evenly distributed light. This can be accomplished by using

The Eye Shield "Daylite" Diffuser and Reflector

This combination unit *diffuses* the light over a large area producing an effect that resembles daylight. There is no glare, no deep shadows, but an even distribution of bright, yet congenial, light.

Compared with the many benefits resulting—better and more work, contented employes, etc.—the cost of the "Daylite" unit is insignificant. Why not try one and judge for yourself?

Made for use with any form of Tungsten or type "C" lamps up to and including 200 watt; can be attached to any fixture. Catalog No. 7, giving full information, gladly sent on request.

Luminous Specialty Company
INDIANAPOLIS INDIANA

Finishing Building at Botany Worsted Mills

Erect Four-Story Building on Roof of One-Story Mill

MILLS having expansion problems will find it worth while to study the history of the latest addition to the buildings of the Botany Worsted Mills, which as a construction problem is unique. In order to provide additional facilities for the finishing department, the erection of a new finishing building, supplying about 130,000 feet of additional room, was decided upon.

The purpose of the building required a location in a predetermined part of the plant, with no unoccupied ground space available. It was therefore decided to erect this new construction over the section of an existing one story building surrounded by other buildings and joined by a similar construction facing the canal. Nor was there available space for the transportation and the storage of building materials, the nearest being a railroad siding on the opposite bank of the canal. The John F. Ferguson Company, engineers of Paterson, N. J., were entrusted with the solution of the problem, and prepared the plans for the new building.

PRODUCTION UNDISTURBED

These provided a space of 140 x 240 feet, no basement, four stories high. The floor loads calculated 150 pounds for the first two floors and 200 pounds for the fourth floor. The contract stipulated that the building must be erected without disturbing the routing methods of the old construction, or of the production. The building being practically inaccessible with exception from the roof, special construction methods had to be devised for the building operations.

The railroad siding on the opposite side of the canal, with the surrounding open space, was utilized for storage of building material which was unloaded by a boom derrick. The sand and stone were handled by a grab bucket into storage bins, handled by the same derrick. The cement was stored in a chute near the bins and despatched to the mixer by a cleated belt conveyor. The mixed concrete was hoisted by a tower at the mixer and chuted across the canal and intervening building to two towers at the new building, to be hoisted again, chuted into concrete carts, and deposited in the forms.

This problem meant that a chute had to be built from the railroad siding across the canal, across a building, and over the roof of the old building to the place of the operations.

INTERESTING ENGINEERING PROBLEM

But this was only part of the problem. The operations required the handling of form material, concrete rods, and other building materials. For this part of the problem, a wooden bridge and a runway were constructed from the siding across the canal and over the intervening building. To make this construction possible, the roof of the building had to be reinforced to take the additional load. This platform was extended along the entire side of the new building and carried two lines of industrial track from which the material was hoisted to the new building by boom derricks.

In order to sink the supporting base, the saw-teeth of the old building over which this new construction was erected were removed and the openings covered and made water-tight. The spaces on the floors of the old building were cleared on Saturday afternoons and on Sundays the columns were dropped through the roof.

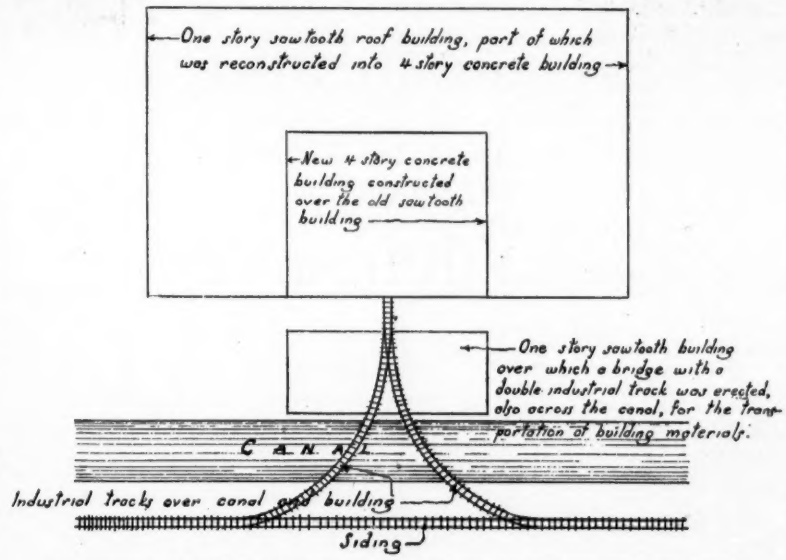
The centering for the first reinforced floor (second story) was supported by the original roof, which was reinforced for the purpose. After the columns for the first floor were erected, the greatest difficulty of construction was practically solved.

The building was completed in four months of regular working time without a single mishap or interfering with the operations in the original building.

This new building, besides being planned for the most practical layout of machinery and efficient routing, has a very pleasing appearance. It is reinforced concrete throughout, with brick panels, the concrete exposed on the pilasters and cornices.

The plans provide for generous comfort and other employes' rooms, while, besides the sprinkler system, the Philadelphia system of fire escapes with an open front has been installed.

The building is in full operation now and fulfils entirely the expectations and original plans of the management.


One story sawtooth roof building, part of which was reconstructed into 4 story concrete building
New 4 story concrete building constructed over the old sawtooth building
One story sawtooth building over which a bridge with a double industrial track was erected, also across the canal, for the transportation of building materials.
CANAL
Industrial tracks over canal and building
Siding

INTERESTING SOLUTION OF ENGINEERING PROBLEM AT BOTANY WORSTED MILLS

New Weave Shed of Lanett Mills

Looms Moved to New Building and Yarn Mill Rearranged

WHEN it was decided to enlarge the plant of the Lanett Cotton Mills, Lanett, Ala., two propositions were open to consideration, the first contemplating the building of a new weave shed separate from the main building, and the second the building of a complete new mill. After careful consideration, it was decided to build a separate new weave shed for housing the necessary new looms, together with all the old looms removed from the existing buildings, and slasher room and cloth room machinery. The space formerly occupied by looms in the old buildings is being filled with spinning and preparatory machinery.

ONE-STORY SAWTOOTH TYPE

The new weave shed is located at the south end of the old building and is connected thereto by a covered passage. This new building is 528 feet long by 260 feet wide, and is arranged for future extension. The building is of the sawtooth type, providing north light, and the side window openings are fitted with steel sash. The bays are 21 feet 4 inches wide and the divisions 25 feet 8 inches wide. The building has but one story and an unfinished basement, used principally for shafting. A small part of the basement is excavated and finished for use as a machine shop. A concreted driveway has been built below the passageway between the old and new buildings. The roof is supported by 7 inch cast iron columns resting on brick piers. Intermediate brick piers furnish additional support for the main floor timbers. One-inch rods in 3-inch pipe are used to tie the roof timbers in the sawtooth construction.

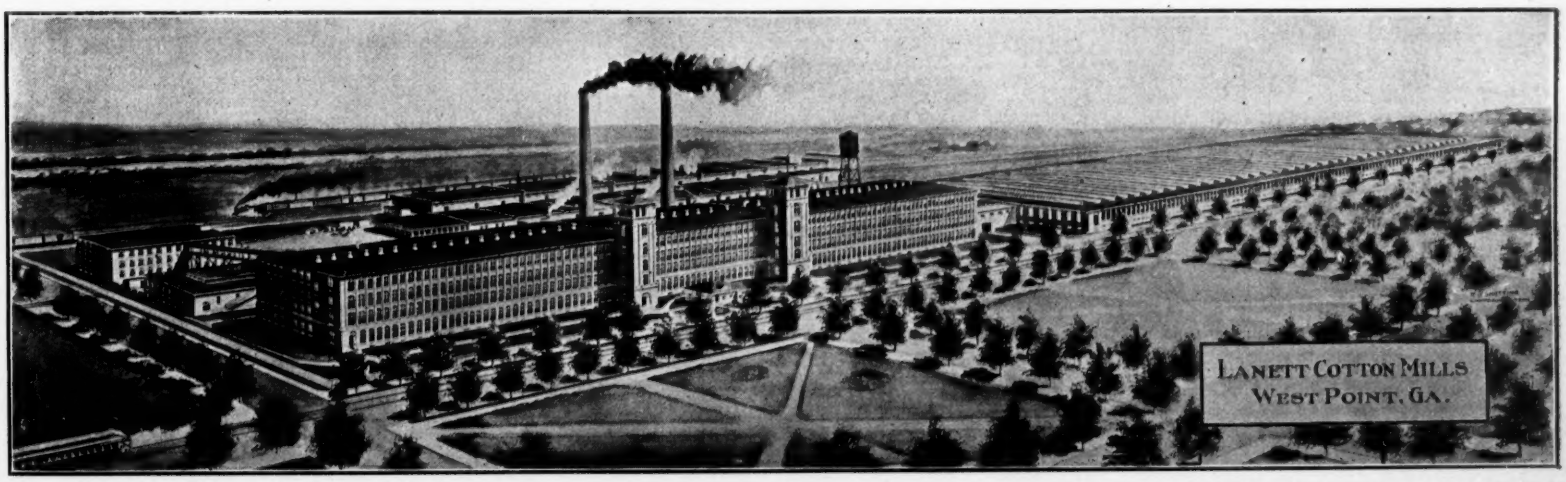
The present installation of textile machinery includes approximately 1,500 looms, 7 slashers and cloth room machinery. The plans contemplate the extension of the building to accommodate a total of approximately 3,000 looms and 15 slashers. The approximate total number of spindles in the completed plant will be 105,000.

POWER AND LIGHTING

The new weave shed is electrically driven with purchased power. There are 17 lines of shafting, each of which is driven by a 35 h.p. General Electric motor through a Link Belt Company silent chain, and each of these lines of shafting drives two lines of looms. Four similar lines of shafting drive single lines of looms, and are similarly driven by 20 h.p. motors. This arrangement does away with all large belts and gives the same positive speed on each line of shafting. The motors are started with hand operated compensators installed on the brick piers in the basement. Belts from the shafting pulleys drive from the basement to the looms on the floor above.

In the electric lighting of the building approximately 475 "Reflecto-Cap" units, with 200 watt lamps, were used. These lighting units were made by the Ivanhoe-Regent Works of the General Electric Company. They are spaced on corners of rectangles approximating 13 feet by 21 feet 4 inches, placed directly over the loom working alleys so as to avoid arch shadows.

The architect-engineer for the building was J. E. Sirrine, Greenville, S. C. The heating and sprinkling systems were installed by the General Fire Extinguisher Company, and the electric power and lighting installation made by T. H. McKinney, Inc., of Atlanta, Ga.



Drawing by R. J. Shutting, Chattanooga.

NEW WEAVE SHED AT LEFT. PLANS CONTEMPLATE EXTENSION TO ACCOMMODATE 3,000 LOOMS

Will You Shut Down?

Cold Storage is Vital Today.

Have You Enough?

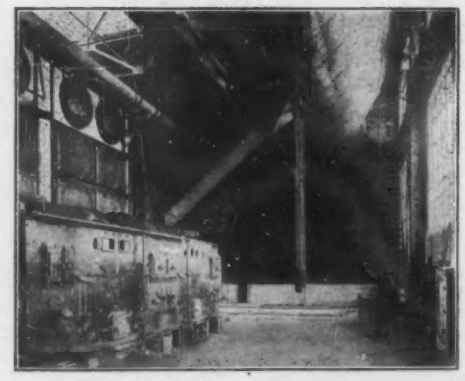
BELT CONVEYOR OVER BUNKER

A belt conveyor is very quiet in action and economical of power. The one illustrated above receives coal from a bucket elevator at the end of the building and discharges its load to the bunker from which it is fed to stokers by means of a travelling weigh Larry.

BEAUMONT

COAL AND ASHES HANDLING

EQUIPMENT



LARRIES FOR SERVING BOILERS

One man handles and weighs all coal burned. Large outside storage of coal made possible. Accurate weight kept of coal burned by each individual boiler. Coal is available for any boiler from any part of bunker. Hand-propelled or motor-driven, floor or cage operated. Write for catalog and prices.

SUSPENSION COAL BUNKER

We build Bunkers of all types, concrete, steel, beam, and suspension as shown above. The Larry is also shown, feeding the Stokers.

How many coal passers and knights of the wheelbarrow are in your boiler room today?

How do they like the job and the wages?

How long will they stay, with your neighbor's factory offering better work for better pay?

Beat your neighbor to it! Promote the pushers of shovel and wheelbarrow to your own factory. Harness machinery to the old job; make the coal move itself, and you will save half your present handling costs besides.

We do not merely sell coal and ash handling machinery; we design and erect the complete equipment for that purpose, from railroad siding to boilers and back again, under one contract. A specialized experience of 25 years is at your service.

Some of the largest power users of the Eastern States are now customers.

Catalog 33 describes some of our installations.

Booklet 34 tells about Skip Hoists for low-cost handling of ashes in large plants.

BEAUMONT SKIP HOIST

Automatic—the modern method. One pull on the rope causes the bucket to ascend, discharge and return. Only part of one man's time required. Possesses eleven distinct advantages. Low installation, operating and maintenance cost. Not affected by heat, grit or water. Will handle soot, clinkers, fire-brick, etc. Write for Skip Hoist catalog No. 32.

R. H. BEAUMONT CO.

NEW YORK: 50 Church Street
BOSTON: 141 Milk Street

PHILADELPHIA: 109 S. 5th Street

Specializing in Coal, Ashes and Coke Handling Equipment for Boiler and Gas Houses

New Storehouse of Goodyear Cotton Mills

10,000-Bale Concrete Building at Killingly, Conn.—Tunnel Under Street

DURING the past year considerable expansion has taken place at the plant of the Goodyear Cotton Mills, Inc., at Killingly, Conn. Details of the reconstruction of the old plant and of the housing and social features were given in the April 7, 1917, issue of TEXTILE WORLD JOURNAL. This company makes tire fabrics and the complete product is shipped to the Goodyear Tire & Fabric Co., at Akron, O. Before additions were made the daily output was 44,000 pounds, whereas, on the new basis a hundred thousand (100,000) pounds a day will be produced.

INSIDE VIEW OF GOODYEAR STOREHOUSE, BEFORE FINISHED COAT WAS APPLIED

The most important of the new buildings is the seven-story cotton storehouse designed by Charles T. Main of Boston, and built by the Aberthaw Construction Co., also of Boston. The new storehouse is solid reinforced concrete construction with small windows in Fenestra steel sash.

The building is 102 x 122 feet, giving a total floor area of 87,180 square feet. The floor is designed to carry a load of 200 pounds per square foot, is 8 inches thick and covered with 1½-inch granolithic finish. The roof of the building is 5-ply tar and slag.

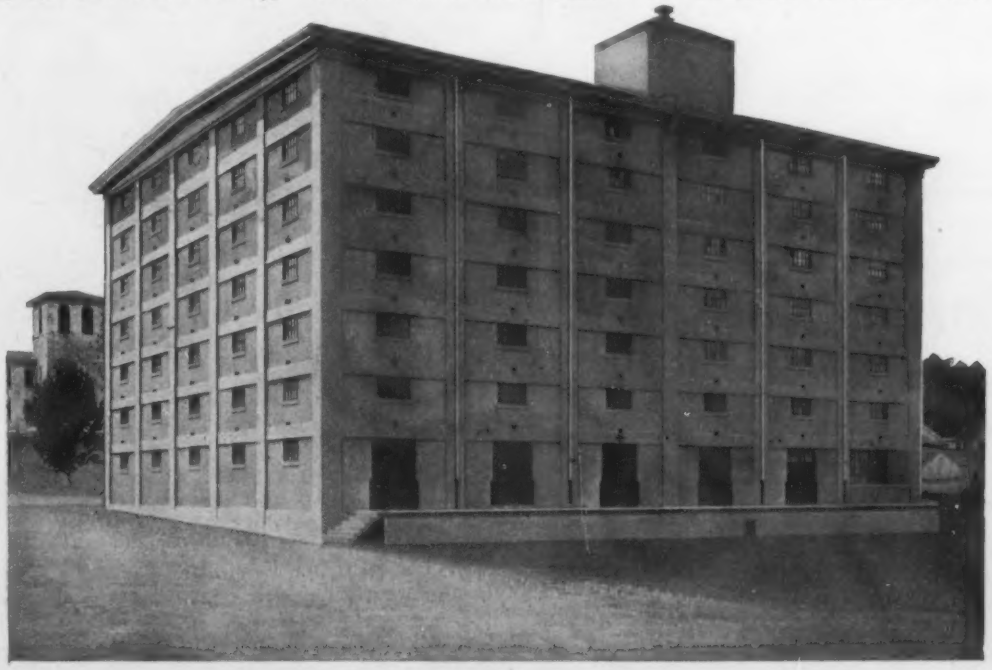
A typical inside view before the finished coat was applied to the floor, is shown in the illustration. On every floor the building has a terra cotta dividing fire wall through the center and regulation counterweighted fire doors, with fusible link. On the first floor there is an additional fire wall which partitions off one corner of the building that is used as an opening room. This has two bale breakers as the equipment for the initial process.

From the bale breakers the cotton is carried by means of a fan to the pickers in another building. The air duct passes through a tunnel going under the street, the tunnel being 5 feet 6 inches by 6 feet 6 inches. In addition to this duct it contains water and steam pipes and electric wires.

On account of its special uses, the story height of the first floor is nine feet, the other stories being eight feet. The opening room floor is made dry, warm and comfortable by the placing of a wooden floor over the concrete. In the other parts of the building the concrete floors are not so covered.

One elevator is sufficient for the building and the floor in front of the elevator on the ground floor has vitrified brick paving in order to stand up under excessive trucking. On the other floors this type of paving is not used.

In addition to this building, Charles T. Main also designed a new one-story card room of standard slow-burning mill construction. The reorganization of the entire existing plant and the rearrangement of the machinery was recommended and executed by Mr. Main. This reorganization and rearrangement reduced the cost of manufacture and increased the output.



10,000-BALE CONCRETE COTTON STOREHOUSE OF GOODYEAR COTTON MILLS, KILLINGLY, CONN.

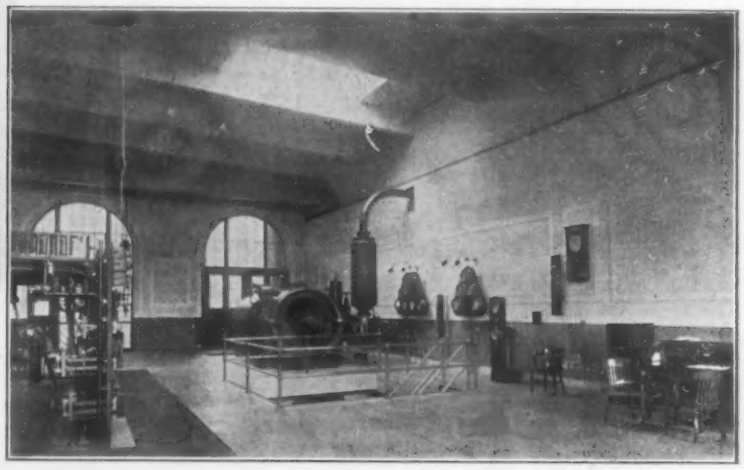
New Construction at Tamarack Mill

Large Spinning Mill, Weaving Mill, Warehouse and Power Plant

THE new Tamarack Mill, which was started in September, 1916, was finished in June, 1917. This is a four-story and basement building, of standard slow burning construction. It occupies 173 x 369 feet, providing over 600,000 square feet of working surface. The foundation for the mill is of reinforced concrete. The heights of floors vary to meet the special requirements of the mill and are as follows: Basement height, 13 feet, 8 inches; first floor, 18 feet, 8 inches; second floor, 18 feet, 8 inches; third floor, 17 feet, 8 inches; fourth floor, 20 feet, 2 inches.

The mill has three towers, two of which are equipped for elevators, while the third is used as comfort and coat rooms. The main entrances to the mill are located on Connaut street. The floors are all four-inch planks, with ⅞-inch maple top floor. Daylight is supplied through large bay windows, the mill having an estimated window surface of 75 per cent.

The disposition of the departments in the new mill has been arranged in the following manner: Basement, store rooms and machine shops; first floor, carding and slubbing; second floor, carding and slubbing; third floor, spooling and warping; fourth, floor spinning. All machines are driven electrically, and equipment consists of 250 cards, 50,000 spindles, and the necessary complementary machinery.



INTERIOR VIEW AT THE NEW TAMARACK POWER HOUSE

A storehouse, 83 x 173 feet, has been erected. This building is also of standard mill construction type, two stories high, but planned for the future addition of two more stories. Besides being used as a storeroom, it is equipped with picking machinery, supplying both the Tamarack and the Jenckes Mills, the cotton being conveyed to the mills through blower systems.

Another new building is a mill of 113 x 137 feet, standard mill construction, basement building adjoining the Jenckes Mills, but under the management of the Tamarack Mill. This building is used for weaving purposes; the basement is equipped for storage, the first floor for cloth inspection, and second floor contains 160 90-inch looms, the third floor quilling and winding machines, and the fourth floor the twisting machinery.

These important additions greatly increase the capacity of this organization and, together with the new power house, constitute the most important mill building activity for Pawtucket.

OIL BURNING BOILERS

The new power house is located on Barton street and is built of standard mill construction. It has a boiler house of 60 x 97½ feet, accommodating six boilers, while the engine room is 40 x 80 feet.

The new power plant contains many interesting appliances, many of them new. The six boilers are of the Babcock & Wilcox type, all equipped for oil burning. The fuel is pumped to

Wetherell Bros. Co.

31 OLIVER STREET
BOSTON, MASS.

STEEL

Textile Steel Specialists
Wire for knitting needles

Put it up to us

IMPROVEMENT in high speed machines has often waited for improvements in lubrication.

Perhaps an improvement in the manipulation of your system is waiting for you—just waiting till you bring into your employ a better lubricant.

The Atlantic line of lubricants includes thirteen grades of spindle oils alone. Isn't it just barely possible that one of these grades will work better for you than the oil you are using?

If you have a lubricating problem isn't it worth while to talk it over with lubricating experts?

Put your problem up to us. Our service to you does not begin nor end with selling you oil.

Our organization includes lubricating engineers of the highest standing. Their broad experience is yours for the asking.

Address all communications to the TEXTILE DEPARTMENT in care of the LUBRICATING ENGINEER.

THE ATLANTIC REFINING COMPANY
Philadelphia *and* Pittsburgh

More than 300
Bituminous Coal Mines use continuously
the "AJAX" SELF CLEANING
ROCKING BOILER GRATES.

UNDER GUARANTEE
15% SAVING COAL. 10% INCREASED STEAM CAPACITY.
25% LESS MAINTENANCE COST. 25% LESS LABOR.
they will do as much for you.
Want Our Catalogue?

VALLEY IRON WORKS.
WILLIAMSPORT, PA.
U.S.A.

the Hammel oil burners from two storage tanks of 20,000 gallons capacity each. These tanks are located below the ground in reinforced concrete vaults. The fuel is transported in auto trucks from Providence and flows directly into the storage tanks.

The plant is equipped with both centrifugal and reciprocating feed pumps and a close feed water heater. The chimney is of radial brick, 120 feet high, while the building is equipped with steel frame windows, reinforced concrete floors, and is practically fireproof.

The power plant contains a 2,500 kilowatt General Electric steam turbine. A cooling tower which is 130 feet long, located with its top 110 feet above the ground, is used. Of course the power house has an elaborate set of recording devices for all mechanical purposes. It is expected by the management that with this new power house the cost of power will be considerably reduced.

Jenckes & Ballou were the consulting engineers and the power house is in charge of chief engineer Tefft, of the Tamarack Mills.

New Building of Ipswich Mills

THE Ipswich Mills have added in the past year to their productive capacity and to their chain of mills by the erection in Gloucester, Mass., of a new mill for the manufacture of hosiery and a storehouse.

Both buildings are of standard brick and timber mill construction, and, as the accompanying illustration shows, form one unit. The storehouse will in the future be an eight-story building, with alternate floors level with floors in the mill. A platform at the rear end adjoins a railroad siding so that direct service is available for shipment of goods and delivery of coal adjacent to boiler room in corner of storehouse.

NEW WAREHOUSE OF IPSWICH MILLS AT GLOUCESTER, MASS.

The mill is at present 145 feet long, but has a temporary wooden end to allow for future expansion. The elevator and main stairway are located in corners adjoining the storehouse, while toilet rooms and a second stairway occupy a tower on the rear of the building at the far end. The toilet rooms are modern in every respect, having enameled brick walls, waterproof concrete floors and enameled steel toilet partitions which facilitate cleaning.

The general office is located in the first story adjoining the main entrance, while a portion of the first floor has been built of reinforced concrete to provide a waterproof floor for processes requiring water in their action.

NEW MANUFACTURING BUILDING OF IPSWICH AT GLOUCESTER, MASS.

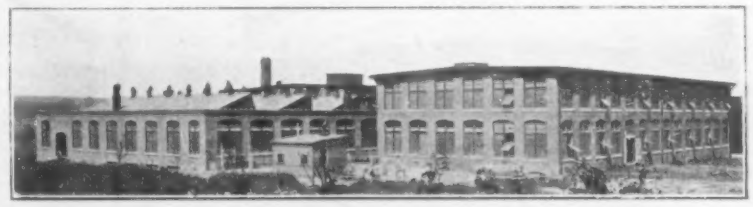
The "Simplex" type of concrete pile was used for foundations, made up of 14-inch steel shell driven to refusal. Machinery was moved into the new plant early in October.

Lockwood, Greene & Co., Boston, are the architects and engineers.

Efficient Dyeing and Bleaching Plant

Many Interesting Developments at Woodlawn Finishing Co., Pawtucket, R. I.

THE Woodlawn Finishing Co. was organized in the spring of 1916 to engage in the business of mercerizing, bleaching and dyeing cotton yarns. The company was determined to have not only a modern equipment installed with due regard to efficiency in handling yarns, but one where cleanliness, good light and ventilation would be given more than usual consideration.



WOODLAWN FINISHING CO., PAWTUCKET, R. I. REAR VIEW OF DYEHOUSE WITH SAW-TOOTH ROOF AND BUILDING NO. 2

The nucleus of the plant was a comparatively modern building of mill construction, 62 x 100 feet, two stories and basement, located in the City of Pawtucket. This building is used for certain preparatory and finishing processes.

OVERCOMING ROOF CONDENSATION

The new construction consisted in part of a one-story bleach and dyehouse, 88 x 108 feet, annexed to the original building. This building has a roof of saw-tooth construction which provides uniform illumination over the entire area and provides a steep pitch to the roof so that vapors can be carried off readily. This obviates to a great extent roof condensation which it is difficult to avoid with flat roofs. The walls are of brick and the floors of concrete. There is nothing which can rot or decay in the presence of excessive moisture which is bound to exist in an industry of this kind.

The dyehouse is built on solid ground. Under the bleach house is a basement with 11 feet of headroom, in which drugs and chemicals can be stored and where liquors of various kinds can be mixed and prepared for use. Located in this basement are tanks of various kinds and the filter which filters all of the water used in the plant. Open drains with covers have been provided whereby tanks can be emptied readily or any overflow taken care of.

KIERS PROJECT THROUGH FLOOR

The bleach house is a model of convenience in the handling of the yarn. The kiers rest on foundations in the basement but project through circular openings in the reinforced concrete floor, so that the operator can easily look into the top of the kiers as he stands on the floor. This makes it unnecessary to do any climbing around, and gives good headroom above the kiers. The various tanks used in the subsequent processes are installed in a similar manner to that described above.

The bleaching tanks are of reinforced concrete, half below and half above the floor, so that the tops are at a convenient height for the operator. The same is true of other tanks, so that it is not necessary to have wooden platforms or steps about, which are not only inconvenient to use but become water-soaked and sources of uncleanliness. The solutions used in the bleach house are carried in tanks in the basement, and are pumped to the tanks on the main working floor with motor-driven pumps. This makes it possible to handle the liquors in the basement, clean out the tanks when necessary, and recharge them, without handling liquors on the working floor.

IDEAS IN MERCERIZING

There are some features in the bleach house which are more or less new. The caustic soda used for mercerizing is dissolved without the aid of steam or the use of mechanical agitators, making the handling of this material extremely simple and far safer than is usually the case. It is cooled in a double-pipe cooler, similar to that used in refrigerating plants, the cooling medium being the water taken from the street mains and used about the plant for general purposes. The mercerizing machine is so arranged that the wash water can be recovered and used in part for dissolving new caustic or for kier boiling.

One of the noteworthy features of this layout is the ventilation of the boiling-off tanks. Little or no vapor escapes into the room, and roof condensation is reduced to a minimum. This was worked out by the management after considerable experimenting, and is very effective.

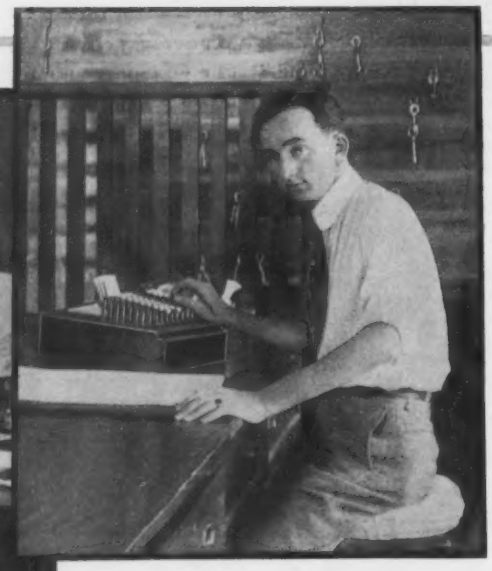
In the dyehouse various dye boxes are set over open trenches, and the floor is pitched toward these trenches so that it is possible to get rid of all waste matter and keep the floor clean with a minimum of trouble.

In addition to the bleach and dye house there is a two-story and basement building of mill construction, 62 x 142 feet, used for the storage of gray yarns, for packing and shipping, and the quilling and winding department. This building is connected with the bleach house through a broad passage-

WOODLAWN FINISHING CO., BUILDING NO. 2. STORAGE, PACKING, QUILLING AND WINDING

Lancaster Cotton Mills

Main Office:—Comptometers used for Proving Daily Postings; Balancing Ledger Accounts; Taking Off Trial Balance; Adding and Calculating all Invoices, Weights, and Yards Outgoing; Figuring Single and Chain Discounts; Figuring Freight; Figuring Cost of Production; Proving Cotton Bills; Finding Averages of Cotton.



Lancaster Cotton Mills

Paymaster's Office:—Comptometers used for Checking Costs; Extending and Subtracting Advances on Payrolls; Figuring Percent Loom's ,Efficiency in Yards Pounds Averages and Fixer, Reports, etc.

Lancaster Cotton Mills

Timekeeper's Office:—Comptometers used for Making all Payroll Calculations, Piece Work, Job Work, and Hours; Adding Supplies; Adding Stock Records.

WHEN all the looms in every textile mill are humming—when the cotton mills are working night and day—there is work and more work for the office force

More work for the Bookkeeper, for the Bill Clerk, for the Cost Clerk, the Payroll Clerk—anyone and everyone confronted with the Accounting Department.

The way to meet that situation is to put a Comptometer on the job. It will cost you less—even when the scarcity of help isn't a factor in the case.

Its ready, easy and instant adaptation to every form of figure work—the high-speed of its one-motion, direct key-action—enables even a diminished force to keep up with extra work.

Here's what Comptometers are doing in the Lancaster Cotton Mills, employing over 1200 people and using more than 28,000 bales of cotton:

Adding and Balancing Cash Books
Adding Deposit Slips and Checks
Proving Daily Postings
Balancing Ledger Accounts
Taking Off Trial Balance
Figuring Interest
Figuring Single and Chain Discounts
Extending and Adding Inventory
Proving Postings by Adding Vouchers or Cash Slips to Balance against Footings of Cash Books
Adding Daily Sales, Voucher and Charge Sheets
Adding Monthly Statements
Adding Distribution of Sales Direct from Charge Slips
Figuring and Proving Freight Bills
Proving Extensions and Discounts on Purchase Invoices

You will have to depend on machines while the war lasts for more work than ever before. It is a good time to investigate now.

CONTROLLED-KEY

Comptometer

ADDING AND CALCULATING MACHINE

Felt & Tarrant Mfg. Co.
1731 North Paulina Ave.
CHICAGO

way in which are located toilet facilities of the most approved and sanitary type.

PURCHASE ELECTRIC POWER

There is no power plant connected with this institution, all machinery being driven with electric motors current for which is furnished from central station service. Steam is developed in two oil-fired boilers, and the result is a freedom from annoyance and dirt which unavoidably accompany the use of coal. The buildings are heated with low-pressure steam taken through a reducing valve from the high pressure main, and the water of condensation is returned to the boiler by means of an automatic pump and receiver.

Thermostatic traps are used on all units of radiation to provide rapid air and water drainage. The steam used in the drying cylinders and dry rooms is at low pressure, and the condensation is returned as in the heating system.

All water used in the plant is filtered through an Hungerford & Terry filter connected into the street service, so that no pumps are required. This filter removes all excess coloring matter, and delivers water which is very clear.

The buildings are all sprinkled. The artificial lighting is done largely with Type C lamps in opalescent shades, which gives an abundance of clear soft light. The management has been very insistent on cleanliness, and an orderly appearance. White paint has been used freely, and the general effect of the whole interior is one of cheerfulness. Much has been done in the way of grading and treating the exterior to present an attractive appearance.

The consulting engineer for the company was Warren B. Lewis, of Providence, R. I.; and the buildings were constructed by the C. I. Bigney Construction Co., Inc., of Providence, R. I. Most of the piping was done by employes of the company working under the direction of the master mechanic.

Weave Shed at Valley Woolen Mills

An Excellently Planned Mill of Inexpensive Construction

THE Valley Woolen Mills, of Cherry Valley, Mass., have during the year built an addition to take care of their increased business of manufacturing shirting flannels. The high cost of building and the necessity of quick occupation induced the management to erect a frame, shingle-faced, one story and basement construction, which admirably answers for the purpose.

INTERIOR OF VALLEY WOOLEN MILLS' WEAVE SHED

This new addition is 200 by 55 feet. The basement is constructed of brick and stone, while the upper part is of wooden frame with fireproof composite shingles. The basement is occupied as a storeroom, also as a finishing room, housing their fulling and gigging departments. The upper floor is the weaving room and is equipped with 104 looms. The looms are fastened into the plank floor with bolts, secured on the ceiling of the finishing room; the bolt slots were bored 1-16 in. smaller than the bolts, reducing the possibility of vibration.

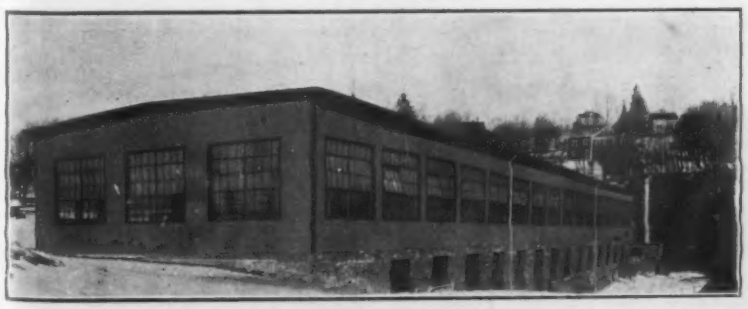
The building has large sectional frame windows on three sides, supplying excellent daylight. These windows are 6 feet high with 18-inch wall between. For heating arrangements ordinary steam pipes were installed. In spite of the prevailing severe winter weather, it has been found that this frame building, protected besides the shingles with paper sheeting between, can be kept warm and comfortable.

Electric drives for machinery are installed throughout the new addition. Some looms have individual drives, while others are arranged for group drives.

The height of the basement is 14 feet, while the upper floor is 18 feet high. There are eight looms to a bay, two looms on each side of the building, leaving an alley in the middle of approximately 9 feet. The roof is tar and gravel.

For artificial illumination, individual Mazda drop lights are used of 100-watt capacity, one light to four looms, suspended nine feet from the floor.

The interior is painted white. The mill is equipped with sprinkler system and fire doors.

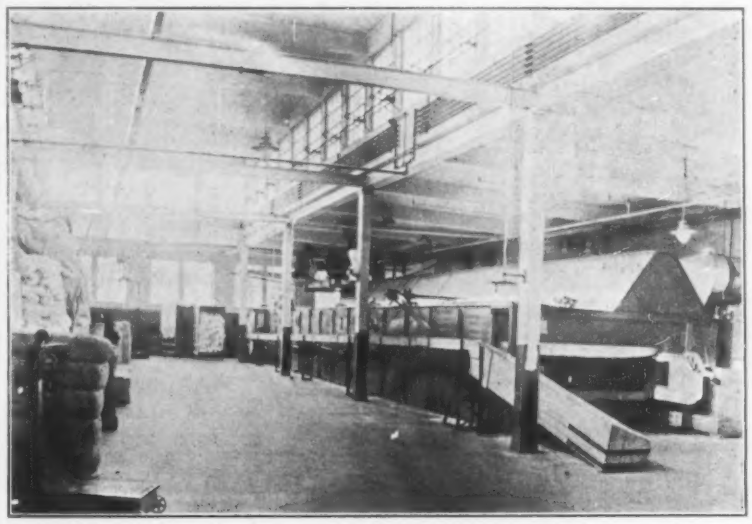


NEW WEAVE SHED AT CHERRY VALLEY MILLS

Cooper Yarn Processing Plant Expands

Addition of Mill Construction with Monitors—Good Light and Ventilation

RECENT additions have been made to the plant of Gerald Cooper, Providence, R. I., mercerizer, dyer and bleacher of skein yarns, and cone, cop and tube winder, as an outcome of congestion in the original buildings and the necessity of enlarging some departments. In the old buildings, bleaching and dyeing was done on the first floor, drying and packing on the second floor, and winding on the third floor. To provide more space for winding, it was believed to be desirable to move the drying and packing into a new building so located that it would later on become a part of a group of buildings used for bleaching and dyeing on a much larger scale.



CORNER IN NEW BUILDING OF GERALD COOPER, PROVIDENCE, R. I., SHOWING CONTINUOUS DRYER

NUMBER OF COLUMNS REDUCED

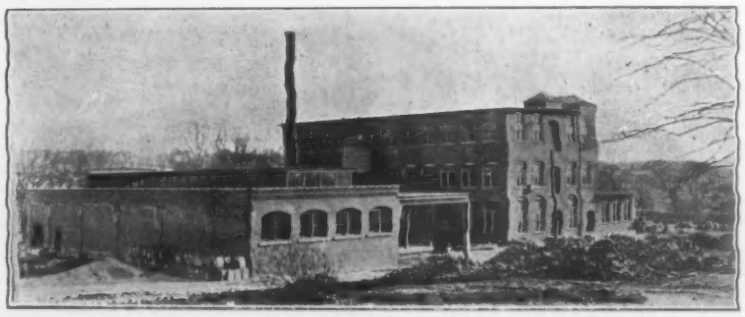
The recent addition is a building of mill construction, 60 x 109 feet, with monitors 20 feet wide and 6 feet high, running very nearly the entire length of the building, and with the sash so hung and operated that nearly 100 per cent ventilation can be obtained. The number of columns has been reduced to a minimum through the use of steel beams for long spans. The floor is of concrete, treated with a liquid hardener, so as to avoid "dusting." There is an abundance of light and good ventilation.

Temporarily, a certain amount of dyeing is being done in one end of this building. A continuous dryer, made by the Philadelphia Drying Machinery Co. has been installed, this machine being of their latest type and equipped with devices by which temperature and humidity can be controlled and the yarn conditioned to get the right feel. The power for this machine is obtained from an electric motor, current being purchased from the Narragansett Electric Lighting Co. The pipe coils in the dryer are supplied with steam at boiler pressure, and the condensation is returned to the boiler.

SUPERHEATED STEAM

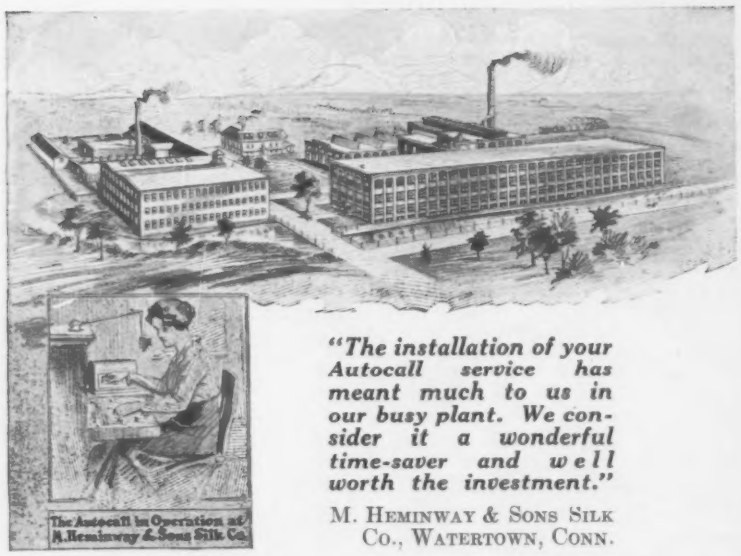
Steam for this plant is obtained from a horizontal return tubular boiler, oil-fired. Owing to the demands upon it it has become necessary to increase the capacity, and a new boiler is about to be installed in another location. When the new boiler is in use the old boiler will be removed and the space now occupied used for a drug room, the location being excellent for that purpose.

The new boiler will be oil-fired, and is of the Manning type. It will be set up in a more or less temporary structure, in close proximity to the old boiler room and on the street front, so that if it should become necessary to use coal the latter can be delivered into the boiler room direct from teams. The boiler has been built with an extra high furnace and long tubes, the first to obtain good combustion and the second to obtain some superheat. The matter of superheat in dyehouses has not been studied very carefully, but it is safe to assume that any reduction in condensation losses in carrying steam from the boilers to the place where it is used, is worth working for.



NEW DRYING, PACKING AND SHIPPING BUILDING OF GERALD COOPER, PROVIDENCE, R. I., SHOWN IN FOREGROUND

The new construction was designed by Warren B. Lewis, consulting engineer, Providence, R. I.



The Autocall in Operation at M. Heminway & Sons Silk Co.

"The installation of your Autocall service has meant much to us in our busy plant. We consider it a wonderful time-saver and well worth the investment."

M. HEMINWAY & SONS SILK CO., WATERTOWN, CONN.

AND you can rely upon it, there isn't anything busier around the Heminway plant than the Autocall. It's the original mechanical Sherlock Holmes in searching out those men, the superintendent, the electrician and others, who get "lost."

That missing superintendent is the bugaboo of most plants. Just as soon as he leaves his desk, there are sure to be foremen calling him for instructions; the general manager wants him for a consultation; the president wants to give him some order. Usually he is hardly out of his office before the search begins. Telephones jangle all over the factory, messengers scurry hither and thither, employees are taken from their work. Time is lost, money is wasted and the matters for which he is wanted must wait.

The master mechanic, the electrician, the shipping clerk, the general manager—these are a few of the other men who are constantly being searched for in *every* plant. In some factories, it takes from half an hour to half a day to find a man—in plants using the Autocall, he is found in thirty seconds.

"THE MECHANICAL FINDER OF MEN"

Autocall

keeps careful watch of all "wanderers." When one of them is wanted the Autocall notifies him *instantly*—and does it without disturbing anyone else.

But, "How much can I save?" We have a unique demonstration plan that will enable you to determine that *before* you purchase. May we explain it to you?

Factory fire alarm service, compulsory by law in some states, may be installed with the Autocall.

205 Tucker Avenue

The Autocall Co.

SHELBY OHIO

Cast Iron Pulleys

We Advocate

the use of cast iron pulleys---

Because—

They are permanent---

They are suited to a wide range of service---

They are true running---

They will not warp or bend---

They hold to the shaft.

We specialize in the manufacture of commercially perfect, symmetrical, balanced, true running cast iron pulleys, which from 3-in. to 72-in. diameter are machine molded.

PYOTT FOUNDRY CO.

CAST IRON PULLEYS, SHEAVES AND FLY WHEELS

(Established 1897)

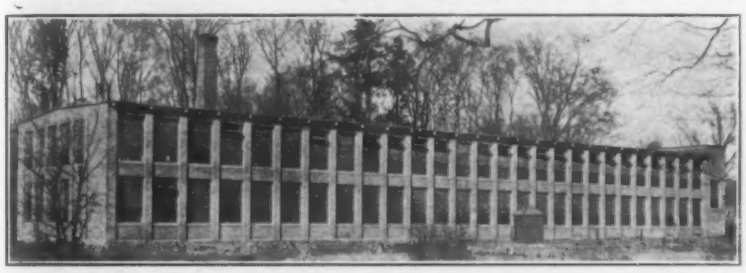
328 N. Sangamon Street, CHICAGO

A Modern Worsted Spinning Mill

Well Arranged Plant Built by Kinney Worsted Yarn Co. at Pittsfield, Mass.

THIS is one of the most recent textile concerns organized in western Massachusetts, and the latest addition to the worsted industry in the city of Pittsfield. Manufacturing worsted yarns for sale to the trade is the particular line of business being carried on at the present time, but as the principal owners are also large manufacturers of woolen fabrics, it may naturally be expected that a worsted weaving department will eventually be added.

The capital stock of the Kinney Worsted Yarn Company is $75,000, and the officials of the concern are all practical men, thoroughly trained in the business, and practice up-to-date methods. Henry R. Russell, head of the S. N. & C. Russell Mfg. Co., is president; C. R. Kinney, connected with the same concern, is treasurer, and R. L. Mackie, an expert worsted yarn manufacturer, is superintendent.



NEW PLANT OF KINNEY WORSTED YARN CO. AT PITTSFIELD, MASS.

The mill building, which is an entirely new structure, stands on a site adjacent to the premises of the Russell Mfg. Co. and is parallel with the mill stream which flows in a south-easterly direction, emptying into the Housatonic River. The building was erected by Beckwith & Pike, a local contracting firm, and is two stories high, 210 by 80 feet. The walls are built of red brick upon a concrete foundation, and topped with a flat gravel roof.

A CHEERFUL INTERIOR

The window spaces are large and are fitted with iron frames. In the inside of the building cheerful conditions prevail. The area of the rooms is ample and they are well lighted. Cleanliness is the rule and no refuse is allowed to accumulate. The walls and ceilings are painted white. The height from ground floor to first ceiling is 13½ feet, and from second floor to top ceiling, 16 feet.

The plant at the present time contains two sets of double drawing machinery, consisting of machines for gilling, slubbing, spinning and twisting, all made by the Saco-Lowell Shops, of Lowell. There are accommodations for one more set of the same line of machinery and such addition will be made as soon as the builders can make delivery. There are thirteen separate machines, comprising a total of 2,600 drawing and twisting spindles, and 4,000 spinning spindles, making a grand total of 6,600 spindles.

The product now being turned out consists of 2-ply yarns made in sizes from 2/16s to 2/40s, from ¼, ⅜ and ½ blood wool. The yarns are all produced in the natural gray shade and are made on the Bradford system. It is estimated that on the 2/32s yarn a production of 9,000 pounds per week of 54 hours is received. The raw material, in the form of worsted tops, is bought from outside concerns.

The finished yarn upon twister bobbins is brought from the top to the bottom floor and reeled into hanks or skeins. It is then packed into large wooden cases for shipment. The reeling machines are placed at the opposite end of the room from the other machinery and are of the latest type, equipped with the most modern devices, including positive stop motions and warning bells.

The separate machines are placed in an order calculated to be most advantageous for direct progress of manufacturing through the different stages; the gilling, slubbing and spinning machines are set parallel on the ground floor, while spinning and doubling machines are installed on the floor above.

PURCHASE ELECTRIC CURRENT

The motive power to operate the plant and light the premises is wholly electrical, applied through motors of various capacities, aggregating about 260 H.P. This is supplied by the Pittsfield Electric Co., an independent concern. Group drives are used for the machinery on the ground floor; the gilling, drawing and first spinning machines are driven by two 10 H.P. motors, two 15 H.P. motors, one 5 H.P. motor and one 3 H.P. motor.

The skeining reels are operated on the same plan by two 5 H.P. motors.

The spinning and doubling machines, located on the second floor, are driven by individual motors, thirty-three in number, or one for each machine. These comprise twenty 7½ H.P. and thirteen 5 H.P. motors. There is also one ¾ H.P. motor in the boiler house to operate the fire pump.

GENERAL ILLUMINATION

The mill is lighted by individual incandescent lights of 25 candle power. The lamps are of the common small size and two hundred and ten of them are placed at equal distance apart throughout the entire mill, without regard to the position of any particular machine.

The steam for heating the plant is generated at the mill, the boiler being installed in an annex near the southwest end of main building. There is ample fire protection and a corresponding decrease in insurance rates. A capable sprinkling system is installed. The exits from the building are spacious and the limited height of the building makes a fire escape unnecessary.

A modern type of elevator is planned, but so far has not been installed, for on account of present conditions the building was erected and the plant started up in a very short time, which has delayed the work of fitting up this auxiliary. However, there is no immediate need for it, as the stairway is short and there is room enough for passenger and light freight traffic. In the meantime a hoist is used to lift and lower heavy materials between the two rooms.

The bobbins of partly manufactured yarn are taken from the machines on the first floor, placed in small trucks, which are hauled up to the second floor where the final process of manufacturing is completed. A motor truck is used to convey the freight between the public railway depots and the mill.

WASH BASINS AND LOCKERS

Suitable provision is made for the convenience of employes. Pure drinking water in abundance is available, also liberal facilities are supplied for washing and cleaning up, in the shape of wash basins, towels and soap, conveniently situated. It is proposed to provide a separate locker for each operative and make the workroom homelike. Lavatories, up-to-date and sanitary, are conveniently located inside the mill, for employes' use.

There is a male overseer in each room, also an assistant to the general superintendent. Their headquarters are in the mill office and adjacent to the only door leading in. Thus there is an effective guard against unwelcome visitors.

This modern mill plainly indicates the wisdom of business men who keep pace with progress and improvement by discarding old methods and adopting new ones. It is an undeniable fact that the product now being turned out by up-to-date textile concerns is more efficient and more economically produced than ever before. The up-to-date machinery installed delivering such large and well filled bobbins necessitates only a few operatives in attendance, thus reducing to a minimum the problem of securing sufficient help.

A. Burritt & Co. Double Mfg. Space

New Brick Mill at Mitchell, Ontario, Provides for Extensions

A BURRITT & CO., Mitchell, Ontario, manufacturers of hosiery, sweaters, mittens, toques and gloves, have erected a new three-story building of brick mill construction, which will give them double the amount of manufacturing space.

The mill is constructed with brick walls, 4-inch plank floors on I beams, 3-inch plank roof on I beams, 1-inch hard maple top floors, square Georgia pine columns, metal sash, wire inserted glass, and non-combustible parapet cornices. There is a separate fireproof stairway, separate fireproof elevator shafts, fireproof closets and separate boiler house, and the building is one hundred per cent sprinkled. The new mill is 160 x 63 feet, three stories high, with no basement, story heights averaging 12 feet, floor to ceiling. Spans are 20 feet, and base 10 feet.

The plant is designed to be a portion of a complete plant 227 feet long, which will have a fireproof stair tower at each end, toilets, elevator and boiler house being located at the rear and midway between the proposed completed structure. Fire-resisting temporary ends have been placed where the present construction ends.

POWER AND LIGHTING

The power will be electricity from an outside source, and is brought into the plant to a horizontal distributing main, which is placed on the ceiling of the first floor. This main is full size from end to end of the plant, and consists of stranded copper conductors stretched through spool insulators which are attached to the lower flange of the I beams. This line acts practically as a horizontal bus-bar the entire length of the mill, and will be continued as the entire plant is completed. Distribution from this main is made either horizontally to motors located on the ceiling of the first floor, or vertically following column lines to motors located on the ceilings of the second and third floors. By the use of this form of distribution, it is possible to re-locate power units at will, without changing main distribution in any way.

The lighting is on the same general principle, with the exception that the so-called bus-bar runs vertically with central main line distributors for each floor. It will readily be seen that, with this form of distribution, varying amounts of power and light can be distributed on all three floors at will, up to the point of taking off the entire capacity at any chosen point.

The architect-engineer has found by experience that the system of electrical distribution gives very excellent results, due to the great convenience in the installation of new power units and relocation. In addition to this, it makes the main wiring installation of a very permanent nature, at slight additional first cost, and greatly simplifies overload protection.

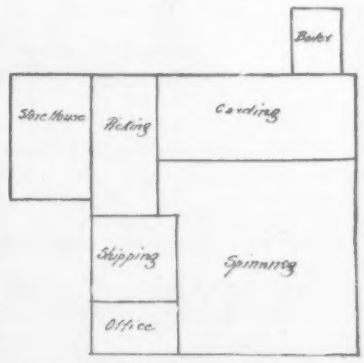
The architect and engineer of this plant is P. M. Smith, of the W. J. Westaway Company, Hamilton, Ontario.

Woonsocket Spinning Company

THE new building of the Woonsocket (R. I.) Spinning Company is a one story and basement construction, of the slow-burning, standard mill type, of very pleasing appearance, with large windows, flat roof, with a monitor.

The mill proper occupies a square of 128 x 128 feet, and is connected with a storehouse, 38 x 57 feet, and boiler room, 24 x 32 feet, built in the rear of the mill. One boiler has been installed to supply the heating requirements of the plant, as power and light are obtained from outside sources. Besides the perfect daylight, drop light installations have been made throughout the mill for each individual machine.

The basement of the plant is used for wool storage, while the wool ready for

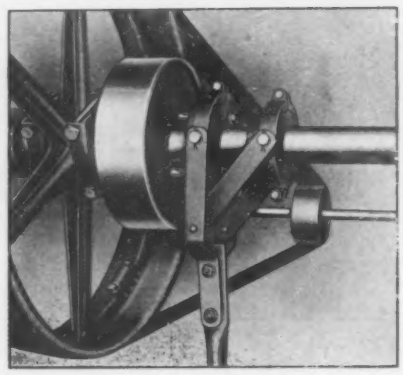


ARRANGEMENT OF DEPARTMENTS IN WOONSOCKET SPINNING COMPANY'S NEW MILL

the picker room is placed in the storehouse on the main floor. The dispatching of the work is arranged in a circular form. The storehouse being at the left rear end of the building connected with the carding room, while the mules occupy the greater part of the main construction and are directly connected with the shipping room and the office.

The building was planned by William F. Fontaine, engineer, of Pawtucket, R. I.

FAFNIR



Patented February 27, 1917

A BETTER FRICTION CLUTCH

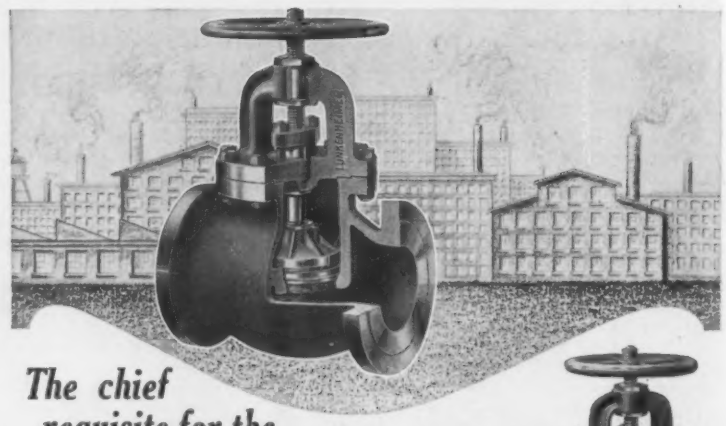
Designed and constructed according to a radically different principle, this clutch was originally developed by The Fafnir Bearing Company to meet the exacting conditions of high speeds and heavy loads in their own plant, when existing types of clutches proved inadequate.

The salient feature of this remarkable clutch is the *Differential Screw,* by means of which it is possible to obtain a great reduction in motion between the shipper travel and the movement of the driven disc, resulting in *tremendous gripping power.*

THE FAFNIR BEARING COMPANY

Conrad Patent Licensee

Main Office and Factory: New Britain, Conn.



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LUNKENHEIMER

Iron Body Bronze Mounted

Globe, Angle and Cross Valves

possessing extreme strength and durability are particularly adapted for steam service.

Their reliability has been proven under all service conditions. They incorporate many improvements in design, including the well-known Lunkenheimer "Seat-guard," which aids in preserving the seating faces and keeping them clean. The seating surfaces are regrindable; bearings are bushed to reduce wear, and all parts, including the seatring and disc, are renewable.

The materials used and the workmanship are of that high quality which characterizes all Lunkenheimer Products.

Standard Pattern for 125 pounds; Heavy for 175 pounds, and Extra Heavy for 250 pounds working steam pressure.

Buy the best—they are the cheapest

Leading dealers everywhere sell them. Descriptive Booklet No. 576-ED illustrates all patterns. Write for a copy.

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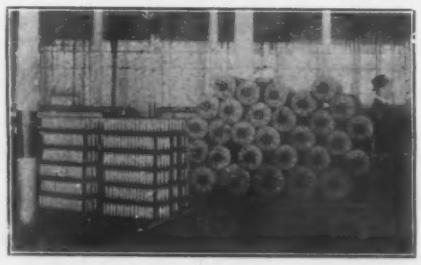
A War-Time Necessity



In normal pre-war times, many manufacturers paid for their Hunt Electric Trucks in the savings in labor which they effected.

How much greater are the savings to be made *now,* when it is next to impossible to get men! The

HUNT 2-TON ELECTRIC TRUCK

is light, flexible, powerful and durable. It will haul your present hand trucks as trailers.

We've been solving haulage problems for forty years. *You* can get the benefit of this experience by getting in touch with our Engineers. Booklet on request.

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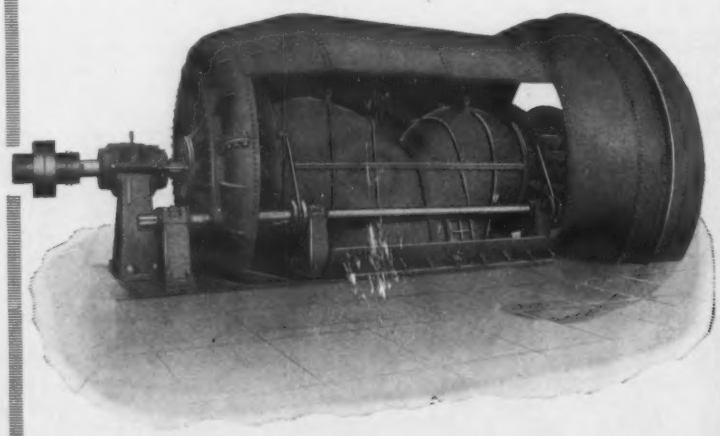
SMITH HYDRAULIC TURBINES

EFFICIENCY AND STABILITY are factors worthy of consideration in these days of intense activity.

Hundreds of Textile Mills throughout the United States are operated by "Smith" Turbines, under all sorts of hydraulic conditions.

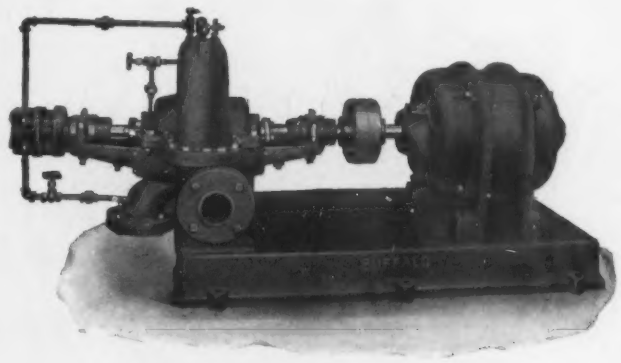


Accompanying illustration shows a pair of type "N" turbines, in steel case—2000 H.P. capacity under 42 feet head

IF INTERESTED, WRITE DEPARTMENT "Y" FOR BULLETIN

S. MORGAN SMITH CO., York, Pa.

BRANCH OFFICES } 170 Federal St BOSTON 76 W. Monroe St. CHICAGO 405 Power Bldg. MONTREAL 461 Market St. SAN FRANCISCO



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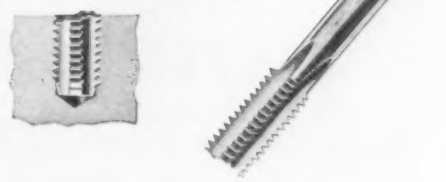
Horizontal Divided Shell
Centrifugal Pumps

are giving satisfaction wherever used because they are designed right and built right. You can always be sure of capacity and pressure you specify when you order a "BUFFALO."

Write for Bulletin 270-73

Buffalo Steam Pump Co., Buffalo, N. Y.
Manufacturers of all Types of Pumping Machinery
Canadian Blower and Forge Company, Limited, Kitchener, Ontario

OF WHAT DOES THIS REMIND YOU?



Suppose that you had on hand when your last tap was broken a commercial device built specially to remove the broken pieces of tap, a commercial device not a homemade article, would you not have saved a great deal of time?

Write us for information

THE WALTON COMPANY

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Manufacturers of Various Steel Products

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General Offices

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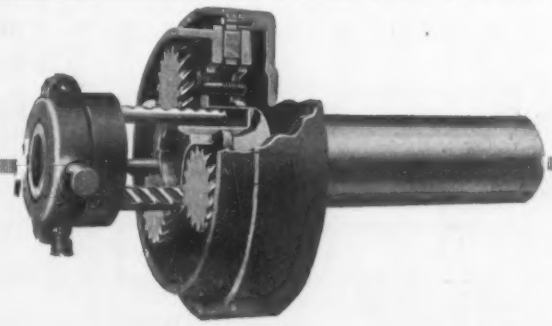

Stop the Fuel Waste!!

On your next trip through the mill notice how many machines and shafts are running idle. In most cases this shows, not careless employes, but the *need for clutches*. If you equip your plant with

Hilliard Friction Clutches

you will eliminate this waste. No longer will it be necessary to run a whole section of shafts and machines when only one or two machines are required.

HILLIARD Clutches are ideal for Centrifugal Extractors, Duck Looms, Fulling Mills, Washing Machines, Slashers, Mercerizing Machines and Tentering Machines.

Ask us *why* the Hilliard is the logical choice. Let us send you one on 60 days' free trial and "see for yourself." Catalog on request.

The Hilliard Clutch & Machinery Co.
ELMIRA, N. Y.

Between the Power Plant and the Machines

Connecting the source of power with the many points where this power is applied, is the Transmission Machinery —a vitally important, though too often neglected factor of production. Inefficiency here means fuel waste.

"WOONSOCKET" Power Transmission Equipment

has established a record of years of faithful service. This is due not only to the correctness of design, workmanship and materials used in the different products, but also to a constant striving for the *best*.

No matter what your transmission problems, write us today for our suggestions as to their solution. Our Catalog contains much valuable information. Write for a copy.

Fairmount Foundry Company, Woonsocket, R. I.

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The one certain way to make the work easier is to reduce the amount of coal handled by heating the feed water in a

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It insures maximum saving of fuel and water, smooth running boiler feed pumps, and best results in water purification because it has large storage capacity. An efficient oil separator forms a part of the heater and all filtration is upward, which means long life to the filter material, because it separates out only those particles which do not settle.

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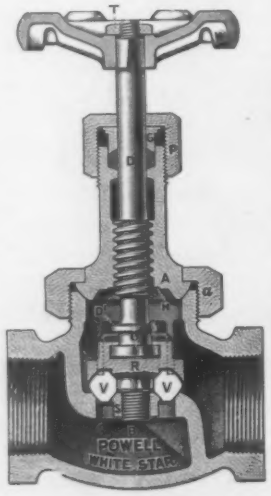
(Especially The "White Star" Valve)



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Our reputation for quality is always maintained by our superior manufacturing facilities which enable us to fill every requirement.

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Homestead Quarter Turn Valves

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Don't rely on the slow, troublesome step-cone pulleys. They only permit two or three set speed variation and you must have a wide range and a quicker method of speed variation to keep up with Uncle Sam's overtaxing demand for military clothing.

"The Reeves" **Variable Speed Transmission**

is the only successful speed changing device on the market. It enables the operator to get any speed desired at a moment's notice.

You will actually be astonished in the increased output and the handsome profit that piles up on the credit side of your bank book.

Let us show you why.

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PRESERVES BELTS—PREVENTS SLIPPING

LOOM FIXERS

Your Supply Box is incomplete without it.

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Sold on merit only, as the price is higher than most.

Write for free half pound, or to save time, order 30, 50 or 100 lbs.

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REG. U. S. PAT. OFF.

In piling bales, barrels, cases, rolls, etc., the REVOLVATOR takes the place of at least one or two men. In storing these products, generally from *three* to *six* men are employed where the REVOLVATOR is not used and there are not many kinds of work more laborious. *One* or *two* men, however, and at the most three, are all that are required if a REVOLVATOR is used and the men are under less strain in doing their work. This saving alone pays for the cost of the machine in a few months.

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½ MINUTE TO CUT YOUR STENCIL ADDRESS
A FEW STROKES OF THE BRUSH AND YOUR SHIPMENT IS
GONE
OUT AND
THE DIAGRAPH

MARK YOUR SHIPMENTS WITH A DIAGRAPH

(Built to Last a Business Life-time)

A SIZE FOR EVERY NEED

A DIAGRAPH STENCIL CUTTING MACHINE IS QUICKER AND CHEAPER—Relieves your shipping clerk for more responsible duties. Worth more to him than three or four assistants. You can own it for a few weeks' salary of one.

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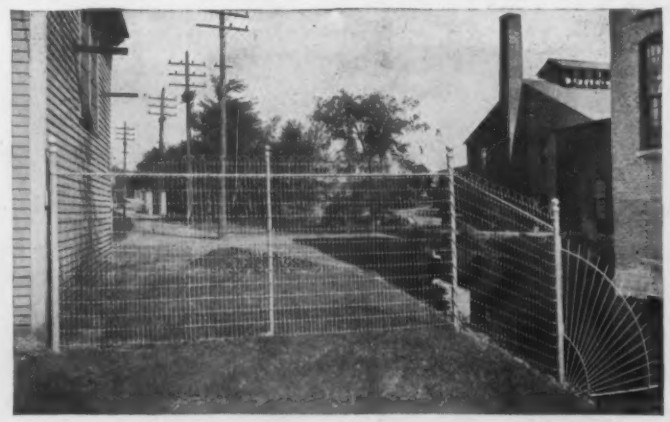
The Only Truck Manufacturers to receive Gold Medal and Highest Award at the San Francisco Exposition.



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It stands the ravages of time and weather, doesn't obstruct the view or keep out the light. Strong, ornamental, dignified, it answers all purposes for which a fence is used. Excelsior Fences are made of heavy wires. Dip-galvanized AFTER making, with an extra heavy coating of pure zinc. The wires are locked at every intersection by our patent steel clamp.
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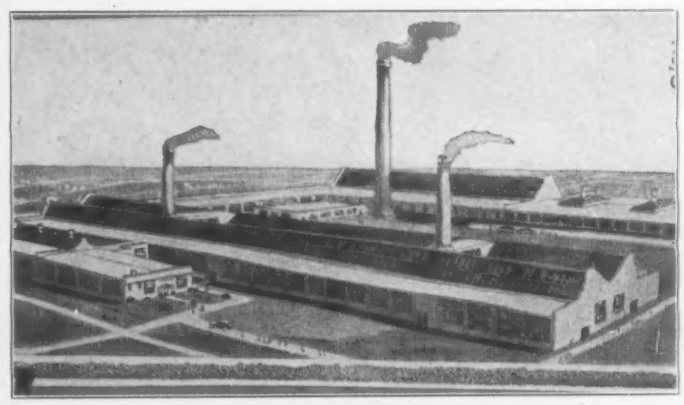
Tempered Steel Wire Heddles for all Kinds of Plain and Fancy Weaves, Iron or Wood End Harness Frames, Power Loom Shuttles, Reeds, Bobbins, Spools, Etc., Etc.

Try Our New Hand Threading Shuttle, Best in the Market



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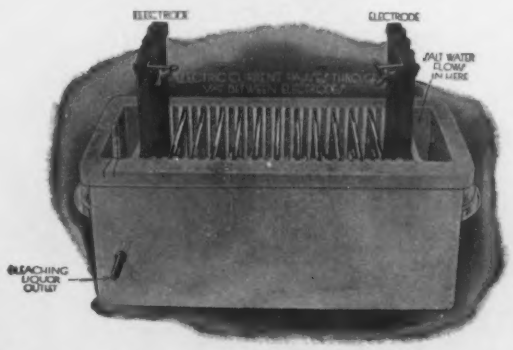

The cut represents our passage type Electrolyzer producing in 10 hrs. the equivalent of 50 lbs. of chloride of lime, operating under 110 or 220 DC, and nothing is used but salt-water and electricity.

THIS IS NOT AN UNTRIED THING

having many years ago passed the experimental stage. We have sold Electrolyzers to many of the large Knitting Mills, both hosiery and underwear, and so far are not aware of any purchaser not being thoroughly satisfied. There is absolutely no question about its merits.

Write, giving amount of lime used daily, current available, with costs.

We make machines of special construction for any purpose.

THE ELECTRO CHEMICAL CO., DAYTON, O. U. S. A.

Successors to

THE NATIONAL LAUNDRY MACHINERY CO.

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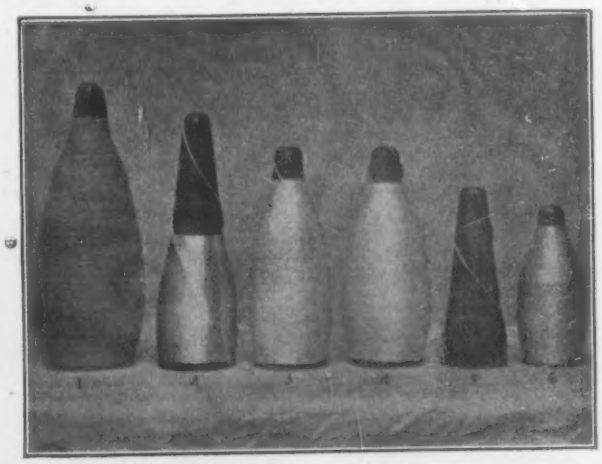
Utica Novelty & Mill Specialty Co., Utica, N. Y.

2-B CONE Yarn Wound Package Patented



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TO KNIT FOR PROFIT

The only wind that will produce results

The 2B Winder and the 2B Cone, Patented in the U. S. and foreign countries.

The 2B Winder and the 2B Cone, Patented in the U. S. and foreign countries.

JACOB K. ALTEMUS, 2824 N. 4th St., Phila., Pa.

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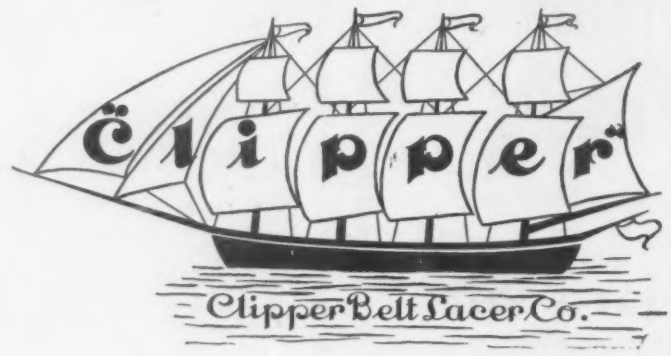

We offer you 30 days' free trial of the "Clipper" Belt Lacer, which cuts down the time lost by a broken belt to 3 minutes.

Many of the 50,000 now in use were installed on this plan.

Furthermore, the lacing lasts as long as the belt itself, and any operative can make it so smooth that the friction loss caused by lumpy rawhide lacing is eliminated.

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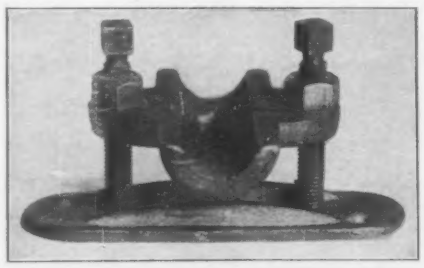
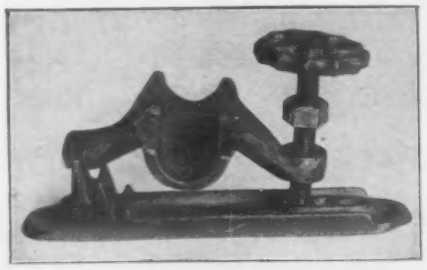
CLIPPER BELT LACER COMPANY, 1016 Front Ave., N.W., Grand Rapids, Mich.



No. 1A—Adjustable Rocker Shaft Bearing
Patented Oct. 26, 1915



No. 1B—Adjustable Rocker Shaft Bearing
Patented Jan. 11, 1916

Used in More Than 500 Mills

Textile Looms are humming along at a terrific pace to help Uncle Sam win the war. Are your Rocker Shaft Bearings standing the strain? The next time some of them wear out try a set of

The Day Adjustable Rocker Shaft Bearings

They will outlast the loom, save the cost of new Rocker Shafts, reduce the seconds and thin places, save in supplies, breakouts, etc. A trial will convince you. Specify the kind of loom you use, how many to send, and we will ship promptly.

"A turn of a screw makes them like new."

TEXTILE SPECIALTY COMPANY **GREENWOOD, S. C.**

Formerly DAY ADJUSTABLE BEARING CO.

SIXTH NATIONAL TEXTILE EXPOSITION

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Under the auspices of the Textile Exhibitors Association, Inc

to consist of

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Real Economy

The mill manager who cuts down on his lighting system to save money is practising an expensive sort of economy.

If he would stop to consider the true effect of lighting on his production, on his spoilage, on the health and efficiency of his operatives, he would quickly see that the best light was none too good for his mill.

It is the tendency in most mills to provide too few lights and to neglect the proper maintenance of the lighting system.

Real economy demands that the lighting be given the attention it deserves as perhaps the most important part of the mill equipment.

We have a new book "Modern Methods in Textile Mills" by Eugene Szepesi which is not a lighting book but a book about mill operation. Send for a copy —it will interest you.

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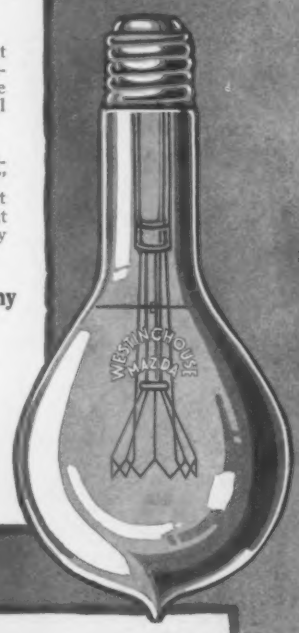
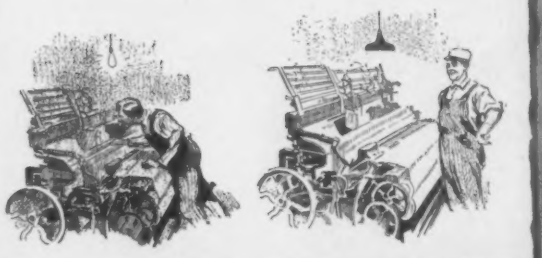
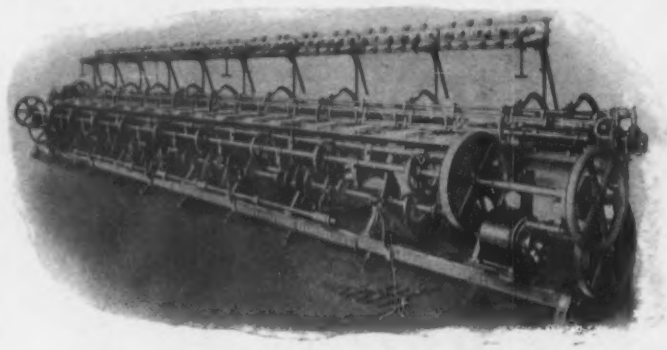






$10,000,000.00 Worth of Full-Fashioned Stockings

are made in America every year.

Mr. Stocking Maker what proportion of these millions are *you* getting? We will welcome the opportunity of *proving* that you can increase that proportion by manufacturing your product on our

Full-Fashioned Knitting Machines

If you are using an imported machine, install one of ours and compare it point for point with the foreign model.

You can then verify our claims that our machine is stronger, made of better material, less complicated and more efficient, both as to quality and quantity of output.

Are you willing to be convinced? Then write now for the details. Your inquiry will receive prompt attention.

We also manufacture—

Machines for the Dress Trimming, Millinery Braid and Shoe Lace Trades, including:

Braiding Machines for all kinds of Braids and Laces.
Spooling Machines for Braid and Tape.
Tipping Machines for Shoe and Corset Laces.
Measuring Machines.
Winders and Doublers.
Also various machines for the Electrical Wire and Cable Trade.

Detailed information about any of the above Machines furnished on request.

Textile Machine Works

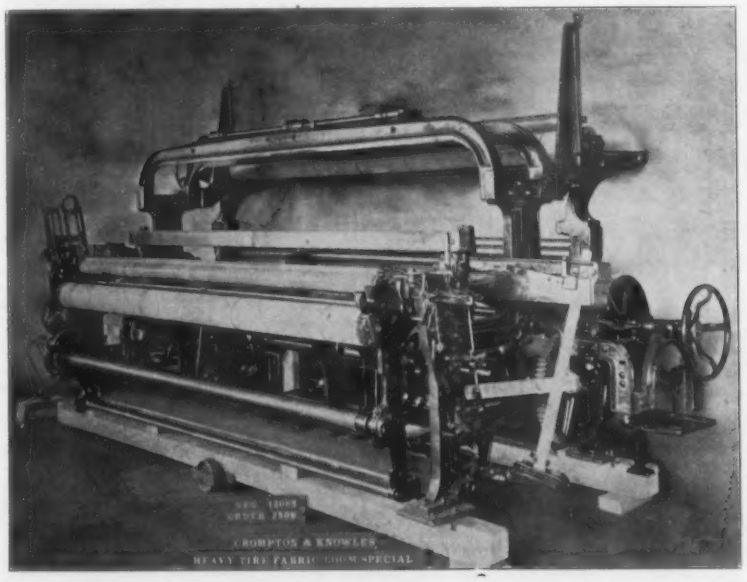
Reading, Pa.

New Machinery and Processes

As in 1916, the outstanding feature of the textile equipment field has been tremendous volume of production, rather than new devices. For the first time in history the Government issued a priority order for textile machinery, which indicates the conditions that have obtained as regards deliveries and the necessity for textile production on war work. There have, however, been several important developments in new machinery and processes during the past year, some of which are briefly described and illustrated on the following pages.

Heavy Tire Fabric Automatic Loom

A special, heavy tire fabric automatic loom has been brought out by the Crompton & Knowles Loom Works, Worcester, Mass., and one model of the new machine ready to be shipped out to a prominent tire fabric mill is shown in the accompanying cut. Every motion comprised in it has passed through the experimental stage, and the loom as perfected is believed by the builders to be as thoroughly efficient as a loom can be.



CROMPTON & KNOWLES AUTOMATIC 90-INCH TIRE FABRIC LOOM

As shown in the illustration, the new loom resembles the duck loom in its rugged construction. The shedding motion is built to work under great tension and is a cam motion with either a double or a single arch from which the harness straps are suspended, the cut showing the double arch. The speed of the 108-inch loom shown is 100 picks per minute.

SHUTTLE-CHANGING TYPE

The lay and picking motion are designed for heavy work and have the characteristic balance and smoothness of operation of all Crompton & Knowles looms. The automatic feature is of the shuttle-changing variety, the weaver threading the shuttle and placing it in the magazine. A feeler detects the exhaustion of the filling and brings the shuttle-changer into action in time to prevent mispicks. The advantage of the new automatic shuttle-changer is that it gives a larger percentage of production per loom on account of the weaver not being obliged to stop the loom to change shuttles. It also gives more perfect goods because the shuttle changes on the pick, which overcomes any possibility of thick and thin places which frequently occur when the filling runs out or when the loom is stopped to change a shuttle by hand.

Hand-threading shuttles especially adapted for automatic work are used and the feeder motion is extremely simple and requires very little attention. Seven shuttles are used at one time; as they are ejected the chute at the back of the lay brings the empty shuttles to the front of the loom where the weaver can easily reach them. The amount of waste on the bobbins in ejected shuttles is very small, in most cases less than is usually left on a bobbin with a non-automatic loom. Standard shuttles and bobbins are recommended by the builders, a variety of tests having been made on this point.

On tire fabric looms even a fraction of a pick variation is a matter of more concern than one or two picks variation in ordinary cotton or wool goods, and the take-up employed in combination with a fraction let-off governs the picks with the necessary accuracy. There is an arrangement for turning back the beam from the front of the loom and the friction rolls above the beam are so arranged that there is very even tension on the warp yarn, and a new beam can be placed in the loom with very little difficulty.

Many of these looms are operated by individual motors. They are back-geared, or, in other words, have the compound drive, the pulley or motor gear being on a separate shaft. On some models it is on a shaft which extends across the loom, geared at both ends, while on others the pulley or motor gear is placed on a short shaft, gearing into the crank shaft. The loom shown is used for making 90-inch tire fabric.

Improved Bobbin Holder

A new patented bobbin holder has been brought out by the Garfield Machine Works, Garfield, N. J., for use on warping machines, spinning and twisting frames, reels and other machines where a sliver is spun into a thread or a number of yarns are to be combined to form ply yarns, warps, etc. The holder is durable, makes a saving in power consumed, reduces breakage of yarn by providing accurate control of tension, requires little oil and is constructed so that where oil is used it is prevented from staining the yarn, and permits an arrangement of the supply packages in the creel which saves space. This last feature is considered of the first importance under the present labor conditions, as the creel may be lowered for workers of short stature or the greater accessibility increases the efficiency of other employes. The devise is made for either coarse or fine slivers or yarns of silk, cotton, worsted or wool.

Gordon Cleaning Machine

The principles employed in the Gordon card attachment have been extended by the Gordon-Hay Company, Utica, N. Y., to a machine for cleaning cotton and cotton waste, which is an independent unit and may be set in rows with cards to be attended by the regular card hands. It cleans all grades of cotton fiber, from the dirtiest waste to the cleanest cotton, with the least injury to the staple, and its cleaning efficiency has proved to be remarkable in mills where it has been installed. This is especially true on very low grades of cotton and waste. It is built in two and three sections, 40 and 45 inches wide, and will handle 375 to 550 pounds of material in ten hours, delivering the cleaned fiber in a soft, spongy mass, best adapted for use in subsequent processes.

The cleaning process is reduced to one machine, with the exception that when fitted with lap stands a breaker lapper is used to make laps for the machine. It may be run with an automatic feeder and the use of a lapper dispensed with. There is little harsh treatment of the fiber and foreign matters are effectively removed without breaking into small particles which are later removed with difficulty, if at all.

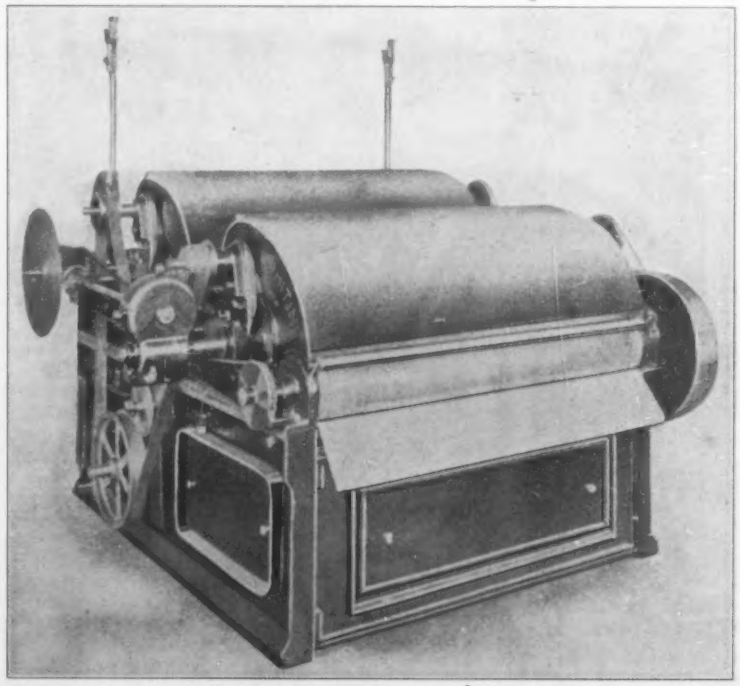
For cleaning and reclaiming good fiber from motes, flyings, strippings and other soft waste, the machine is described as invaluable, and practically every cotton mill can use it profitably in double or triple sections to reclaim dust room and trunk waste, picker motes, flyings and strippings, materially increasing the values of these by-products. The waste produced by the machine is of practically no value, the separation of the foreign matter from the fiber being so effectively accomplished.

USES OF CLEANING MACHINE

Besides reclaiming good fiber from soft waste, the machine makes available a lower grade cotton. A large percentage of low grade cotton is produced in every crop, which possesses excellent spinning qualities, but whose use is precluded in the manufacture of certain goods, where it might be used to advantage, on account of the difficulty in cleaning. This difficulty is removed by the cleaning machine, and such cottons are finding a use in a greater variety of goods. There are also special advantages for mills using dyed or bleached raw stock, or manufacturing low grade duck, rope and similar goods. Woolen mills using carded cotton and prepared waste can use the machine instead of carding their cotton.

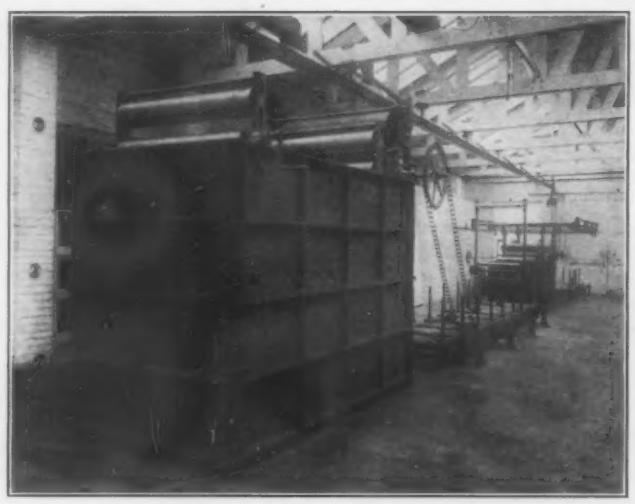
MEETS UNDERWRITER REQUIREMENTS

The machine does not create a fire hazard, and no special enclosures, hoods or lint closets are necessary to comply with underwriter requirements. The lengths are as follows: Two-section, 5 feet 10 inches; and three-section, 7 feet 11½ inches. The width of a 45-inch machine is 7 feet 8 inches. The actual floor space required by a 45-inch, three-section machine is practically the same as that required by a 40-inch revolving flat card.



TWO-SECTION GORDON CLEANING MACHINE—DELIVERY END

Continuous System Warp Indigo Dyeing



THE above cut partially illustrates the most economical and practical system of INDIGO DYEING for Warps. This system as shown in cut, in connection with Oxidizing Overhead (not shown), permits of the boiling out and a bottoming shade in a Two-Compartment machine, and a run through the Indigo Vat in a continuous operation. The above system is in operation in some of the largest and best mills in the country. For further information and prices, write.

COCKER MACHINE AND FOUNDRY CO.

Builders of

Warpers, Beamers, Ballers, Warp Dyeing Machines, Reels

GASTONIA - NORTH CAROLINA

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D. C. Andrews & Co., Inc.

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Through bills of lading issued to all parts of the world.

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We solicit the opportunity of quoting rates on your next shipment

The "ECLIPSE"

Portable Mill Sewing Machine

Over 6,000 in Use

For Stitching Together the Ends of Cloth Before Dyeing, Drying, Washing, Bleaching, Shearing, Etc.

THE "ECLIPSE" Mill Sewing Machine is designed for sewing the ends of cloth together and is especially adapted for use in Cotton and Woolen Mills, Print Works and Bleacheries.

It is the strongest and least complicated machine in use today, has less parts than any other machine and is therefore less liable to get out of order. It will sew any grade of goods, wet or dry, thick or thin.

Wherever this machine has been used it has given complete satisfaction.

Write for Bulletin

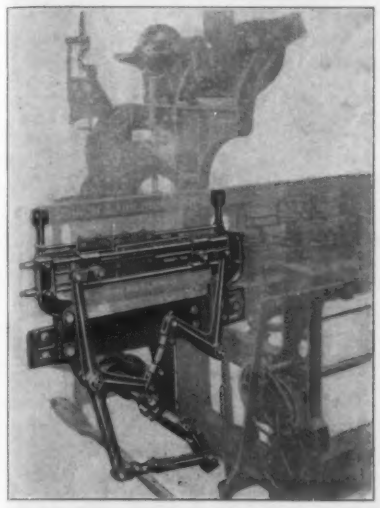
WM. SMITH & SONS

TEXTILE MACHINERY

LAWRENCE, MASS.

Shuttle Motion for Label Looms

A high-speed shuttle motion for label looms, which has been in process of development for the past two or three years, has been placed on the market by Schaum & Uhlinger, Inc., Philadelphia, Pa. The new motion has been placed on a number of label looms, to which type it is particularly adapted, and has proved very successful in increasing production and simplifying operation. The illustration shows the new device which is applicable to all multiple shuttle battens for making narrow fabrics.



SHUTTLE MOTION FOR LABEL LOOMS

The motion of the shuttle is positive, not being dependent upon flexible connections such as chains or rawhide. Each series of shuttles is free from the actuating means as soon as the filling has been laid in either direction, so that, should occasion require, shuttles may be freely moved by hand in either direction while the loom is at rest. It is pointed out that this is the first time a batten or series of shuttles of a narrow ware loom has been given positive motion and then left free to be moved by hand.

The manufacturer calls particular attention to the fact that the new motion is replacing the older types in a number of plants. The absence of the necessity for attention on this new improved device allows one man to take care of three or four looms in the same time spent on one loom with the older type motion. The loom need not be turned back to find the proper pick and shuttles can be moved into quilling position independent of the loom, because the picker engages and disengages at every pick of the loom, so that the shuttles in the battens can be moved by hand independent of any other motion of the loom.

It is an effective motion, rigid in construction and of simple movement. All the advantages of the older type shuttle motions are retained in the new motion with added advantages of high speed, durability, simplicity and dependability. It is readily understood by the fixers, and requires little attention.

New Degumming Material

The Electric Smelting and Aluminum Co., of Lockport, N. Y., have developed a degumming material for manufacturers using silk, which they state will effect substantial savings in soap and time and leave the silk in the best condition. The new material has been given a thorough trial.

The new material is used with olive oil soap or any other silk soap, and as it sells for considerably less than the soap, every pound of the latter which it replaces means a saving. Further than this, when it is considered that with the use of 2 pounds of the new degumming material, 8 pounds of olive oil soap can be eliminated, it will be understood that economy on a large scale follows. This result has been obtained in practice, the company states.

The manufacturers state that the new product does not yellow the silk, removing all dirt, oil and grease from the fiber. The operation of boiling-off is not complicated in any way by its use, as it is simply added to the baths in the usual way, combining with and removing the gum.

Number 80 Coner and Supercone

The new Number 80 winder was brought out by the Universal Winding Company, Boston. The yarn package produced on this machine has been termed the Supercone on account of the quantity of yarn it contains and its uniform delivery of material.

WINDS COTTON, WOOL, AND WORSTED

The Number 80 winder has been specially designed to wind cotton, worsted, and woolen yarn into conical packages eight inches long and of a maximum diameter of ten inches. Embodied in the machine are new mechanical devices which automatically operate to vary the progressive element which forms the supercone.

The new Number 80 is built in gangs of twelve spindles, six on a side, occupying a floor space 7 feet 6 inches, by 36 inches and so arranged that a number of gangs may be coupled together for a single unit drive. There is only one traverse cam for each twelve-spindle machine; there are no expanding cone arbors to mutilate the paper cone tube; the stopping, starting and tension devices are extremely simple, and the manufacturers claim that an operative has one-third less motions to make in the process of operating this machine than on coners in general use. The yarn speed is uniform at all stages of the winding process, and the possibility of chafing soft yarn from any cause has been reduced to a minimum. All high-speed shafts are mounted in self-oiling bearings; all parts are interchangeable and are manufactured in conformity with proved standards of high-class workmanship.

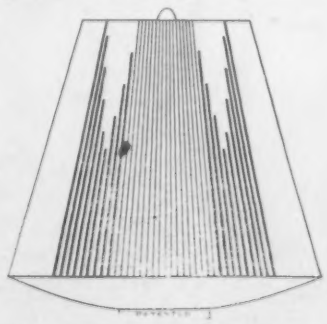


DIAGRAM OF SUPERCONE, SHOWING METHOD OF BUILDING

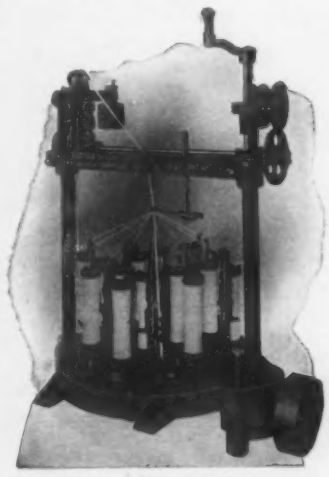
In the Supercone, the manufacturers point out, a supply of yarn for knitting machines has been successfully modeled, which not only contains more material than any style of package previously produced, but also, by reason of its length of traverse, so as to lay more yarn at the base than at the apex of a cone. These variations of traverse range from eight inches to four inches, being periodically introduced to establish the progressive build, insure a uniform delivery yarn. The Supercone is eight inches long, with a possible maximum diameter of ten inches. The net weight of a full-sized package ranges from four to six pounds, depending upon the material wound.

The New Era Braider

The Era Manufacturing Co., Providence, R, I., has brought out a new braiding machine, which on account of its many new features has been named the New Era Braider. In its construction, refinements have been worked out with a view to increased production of first quality braid, and the new machine is a designed product with all parts machined by accurate jigs, insuring perfect interchangeability. Among the advantages claimed by the manufacturers are fewer and simpler parts, so constructed as to give increased speed, ease in operation, accessibility, safety to operator, relative freedom from shadows, and cleanliness of work. The new braider is made in all sizes desired to produce braids from the smallest to the largest.

SELF-LUBRICATION OF GEARS

Perhaps the most notable change is the self-lubricating feature, the entire mechanism running in oil. By this arrangement it is necessary to oil only once in several months, which makes a considerable difference in production, saving the time lost in stopping machines, locating oil holes and oiling each part carefully. There is less wear on gears and studs, less waste of oil and freedom from the usual drop of black oil on the bottom of spindles which is constantly getting on the material.



NEW ERA BRAIDER

The New Era Braider is particularly well adapted to make elastic braids as its freedom from superfluous oil protects the rubber. An extra fitting is supplied to regular machines for the purpose of guiding the rubber from the tension rolls.

Warp Mercerizing Machine

A very interesting development in the construction of a warp mercerizing machine is noted in apparatus built by Smith, Drum & Co., Philadelphia. The machine consists of the usual series of tanks for boiling out, treating with caustic soda, washing, treating with dilute acid and finishing, having the various compartments fitted with squeeze rolls and carrying rolls.

The two boiling compartments have a specially designed type of reel instead of the old style roller. The caustic compartments are fitted with extension frames to provide a longer time of treatment with caustic soda, without reducing the speed at which the yarn passes through the machine. The wash after the caustic is amply provided for by the number of compartments intended for this purpose, while the acid treatment is well handled in the lead-lined tanks that adjoin the caustic wash tanks. Brass extension frames are used in this compartment also, for the same reason as in the caustic tanks. The five compartments following the acid treatment amply provide for the washing of the yarn after this stage of the process.

All of the top carrying rolls of this machine are fitted with roller bearings of an improved type to eliminate friction, while the bottom rolls are fitted with bearings built of a material designed to withstand the action of the various liquids in which they run.

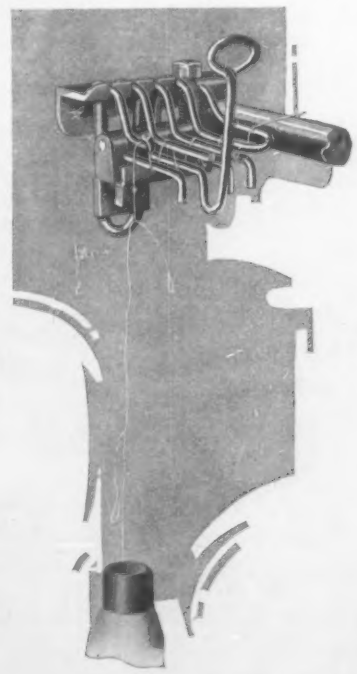
A device is also provided with the machine for the purpose of winding a binding thread in spiral form around the warps as they come from the warp creel, and before they enter the boiling box. This thread binds together the warps and also prevents any loose ends from wrapping around the carrying and squeeze rolls. The machine is designed for a large capacity production, while insuring the highest quality of the work.

Rub Roll Aprons

Since early in 1917 the Graton & Knight Manufacturing Co., Worcester, Mass., have been manufacturing rub roll aprons in large quantities for woolen and worsted mills. The different surface finishes or corrugations for rub roll aprons depend usually upon the texture of the material to be carded. For carding cotton or shoddy, a pliable apron is required, for which they recommend their Spartan brand apron, plain finish, with flesh side out, as it has proven most satisfactory. For the coarser woolen or worsted yarns, the straight, diagonal or diamond grooved aprons perform the work satisfactorily, and they recommend both finishes in preference to the perforated aprons. At the present time they are furnishing the trade aprons of any dimension with any surface finish desired.

The Houghton Yarn Tension

L. T. Houghton, 89 Exchange street, Worcester, Mass., manufacturer of patented specialties for spinning, twisting, winding and spooling, has brought out a new tension for use where yarn is delivered over-end. It is made to be applied to any winder or spooler and has many advantages in giving a uniform tension, convenience in threading and adjustment, and in acting as a yarn clearer. Whether the object of this type of winding is economy in



HOUGHTON YARN TENSION

"SELLING HELPS" FOR DEALERS

A MEYERCORD WOOD PANEL SIGN. Size 6 x 15 in.

Signs like these will sell goods. Dealers like them. They are prominently displayed, last for years. Designs in colors and gold. ***Non-breakable.*** Each in carton.

A Few Users of
MEYERCORD SIGNS

Brown, Durrell & Co.
Burson Knitting Co.
Paramount Knitting Co.
James Lees & Sons
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Cooper Mfg. Co.
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Interwoven Stocking Co.
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Samples and Sketches FREE

USED BY
MANUFACTURERS OF
HOSIERY
UNDERWEAR
YARNS, Etc.

CUT-OUT SIGN. 6½ x 7 in.

CUT-OUT SIGN. 6 x 7 in.

A FEW OTHER MEYERCORD SIGNS

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YOUR ATTENTION PLEASE:

If you are having *difficulty in securing Tapes* we are here to co-operate with you after years of satisfactory service as

MANUFACTURERS OF

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(Bias and Straight)

ESPECIALLY

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Write us regarding our Economical method of slitting and folding piece goods—either bias or straight. We can save you money.

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26-28 N. Fourth Street **Philadelphia, Pa.**

Nicetown Dye Works

AMERICA'S STANDARD HOSIERY BLACK

"It all depends upon the dye"

Dyers of

HOSIERY AND YARNS

Black and Colors

BY eliminating any weakness in the fibre we have made America the home of hosiery dyeing with

Hagar's "Intense Black" Dye

Works: Westmoreland and "C" Streets
PHILADELPHIA, PA.

waste, greater production or some other requirement, the new device is claimed to meet the purpose.

The development of the new tension is due to a visit to the Lancaster Mills by Mr. L. T. Houghton, in connection with the installation of some of his spinning and twisting specialties. While at the Lancaster plant an official remarked that he wished Mr. Houghton would develop a tension for filling-wind yarns. Extensive experiments were made in the Houghton shop in Worcester with the result that the device, shown in the illustration, was perfected.

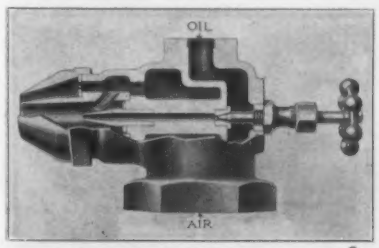
Carbonizing Machinery

In view of the larger importance of carbonizing, the James Hunter Machine Co., North Adams, Mass., have devoted considerable attention to the subject of carbonizing equipment. As a result they have developed machines in which they state the following ends have been attained: Reduction in time required for the process, less floor space occupied, reduced labor cost, economical steam consumption and superior condition of stock. A rotary acid immersing tank, a dryer and baker, squeeze rolls and a duster are used. To neutralize they introduce a paper mill washer, then to squeeze rolls and then into dryer.

By the use of the rotary acid tank in connection with squeeze rolls in place of the extractor commonly used, they claim that they are able to reduce the immersing process time approximately 50 per cent. By the use of the agitating table dryer in connection with the immersing machine and squeeze rolls drying and baking, they state that they cut down the floor space required for a given production approximately 50 per cent. These dryers, it is pointed out, are economical in steam consumption, and by their method of handling stock bring it out in the best condition.

Turbo Sprayer for the Continuous Oiling of Wool

One of the developments of the years immediately ahead of the textile industry will be the better conditioning of stock for carding, combing and spinning. Instead of adding oil, emulsion or moisture at one or two machines, they will probably be added at every machine to bring the stock up to the best condition for working in that particular process. There will be less waste, more production and better product when advancement is made along this line, and the right materials are added in the proper proportion and in the best form. At present, opinions vary widely among manufacturers re-

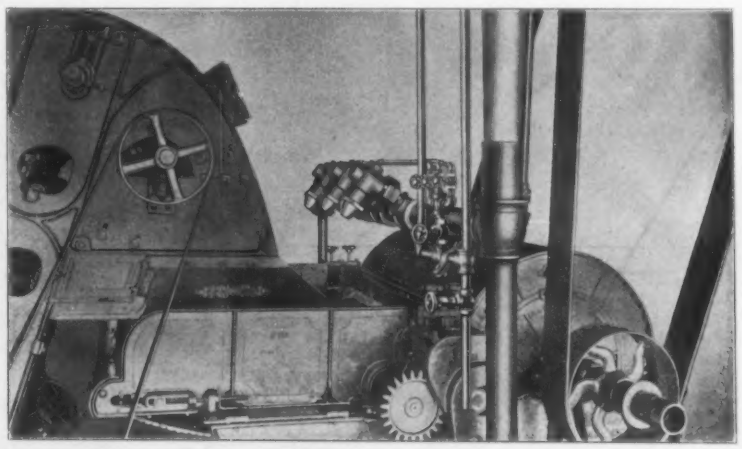


TURBO SPRAYER, PARTLY IN SECTION, SHOWING HOW SPRAY IS FORMED AND CONTROLLED

garding the particular oil or mixture that is best to use on wool, but all agree that whatever is used should be finely divided, applied evenly and properly measured.

Spray, produced by the various types of nozzles in which fluid under its own pressure is centrifugally separated is not satisfactory for oiling purposes, because in the first place too much fluid is delivered through a single unit, and in the second place, the quantity cannot be varied without changing the velocity, which changes the quality of the spray and the shape of the jet, thus affecting the area of distribution. The desired uniform quality and distribution, with control of quantity, is therefore a physical impossibility with devices of the simple fluid type. It is seldom that a humidifier can be used because the spray which it produces is so fine that the larger portion of it is evaporated or floats away and is deposited elsewhere than on the desired surface.

The above difficulties have been overcome by the Turbo Sprayer, which has



TURBO SPRAYER USED ON APRON OF MIXING PICKER WITH AUTOMATIC FEEDER

been brought out by the G. M. Parks Co., Fitchburg, Mass. It is now being used successfully under the more exacting conditions of moistening stock on mixing pickers with oil or emulsion, with a saving in labor and oil and improved distribution on the stock.

HOW TURBO SPRAYER OPERATES

In operation, the fluid is supplied to the head either by gravity, or by pressure in a circulation line. In either case the rate of flow is controlled by a needle valve, whose position is indicated by the movement of a pointer over a graduated dial. Air for producing and distributing the spray is supplied to the sprayer from a pressure blower. Entering the sprayer it passes from the main chamber through tangential ports into the central tip, where by centrifugal action it breaks up the jet of fluid as it leaves the fluid tip; this jet of spray, leaving the central tip, is caught up and distributed by the balance of the air which leaves the muzzle between the outer and inner tips in an annular blast.

The quality, or character of the spray, as required for the purpose is first produced by trial of air tips of different sizes and by modifying the air blast pressure. Once the desired quality is secured, the quantity of fluid is regulated by adjustment of the needle valve, the quality always remaining constant, and it is this feature which makes the device so peculiarly adapted for the use with textile fibers.

Improved Winder Brought Out by Jacob K. Altemus

Good knitting begins with good winding. This is a truth that has been impressed on every practical knitter many times. Today the high speed of machinery compels better wound packages than ever before in order to reduce press-offs and seconds and produce a uniform fabric. It takes all the skill of an expert operator to make goods exactly in the construction he sets out to produce and only inferior results can be expected from anything short of the best wound packages.

A new machine known as the 2-B winder has been brought out by Jacob K. Altemus, 2824 North Fourth street, Philadelphia, Pa., which, with the cone used for winding is becoming a valuable factor in the production of knit fabric in the most desirable condition.

The cone and the winding allow the yarn to come off in a manner to produce a soft, flexible fabric of a uniform construction. The yarn is delivered freely without undue tension or resistance throughout the whole off-take of the package, as a result of the manner of winding and the technically correct base or foundation on which the package is built.

The principle on which the yarn is wound and the package is built up is novel and simple, and is effective and easily controlled. The mechanism of the machine is not difficult to handle and has been brought up to a high standard of efficiency. It is claimed to eliminate problems in winding silk, artificial silk and cotton that have been difficult to control and to allow the making of a fabric as soft and flexible as required or of any other character needed. Even defective stock can be overcome to some extent, it is stated, by adding to the knitter's skill absolute control over the elasticity of his stitch.

UNDER-WINDING EFFECTIVELY PREVENTED

As a consequence of the method of building the package under-winding is effectively prevented. The points at which the descending yarn intersects with the ascending coils are scattered over the surface, so as to destroy any repeated coincidence between adjacent overlaid coils throughout the package.

It is claimed the variable spacing of the coils also permits more yarn to be wound upon the cone than would be possible were the coils of either the up or down layer evenly spaced. The greatest angle of bend of the layer sets is near the cone, the angle gradually disappearing and there being no perceptible bending in the final layer set. There is a great reduction in the drag of the yarn on the off-take and the quick descent of the descending layer because rapid unwinding of the yarn.

A NEW DEPARTURE

In many ways the new development is a departure from all known methods, and patents have been granted on the machine and the wound package. Mr. Altemus states that it overcomes many of the problems that arise from inferior winding and that the machine will earn its cost in a very short period besides giving many other benefits that can only be understood by using the yarn wound on the new principle. The wound package can be used for any kind of yarn and on any knitting machine.

Centralized Dustless Card Stripper System

The crowded condition of machinery in many card rooms has made it impractical to use the regular dustless card stripper with portable vacuum apparatus for collecting the dust. To extend the advantages of the dustless card stripper to such rooms, a centralized system has been brought out by William Firth, 200 Devonshire street, Boston, which works on the plan of a central station to which the dust is carried by vacuum. This will mean a great advantage to many mills, for no matter how crowded the machinery, or what the arrangement of cards is, the new system insures the same clean conditions of work, sliver and atmosphere that is given by the standard dustless card stripping apparatus.

Any convenient or out-of-the-way place in the room may be selected for the central station vacuum apparatus, which requires a space of approximately 3 by 3 feet. It is self-contained, being equipped with a small 1½ h. p. motor. Leading from the vacuum apparatus, over each row of cards, is a line of 1 to 1½ inch permanent piping, to which is conveniently connected by small lengths of flexible tube, the housing over the stripping brush.

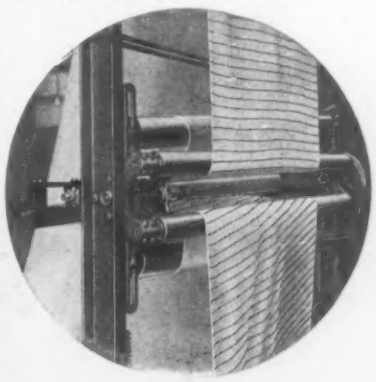
OPERATION OF APPARATUS

By partial vacuum, created by the fan in the central station, all neps, dust, sand and grit are taken directly from the stripping roll, through the flexible tube and line of piping, and deposited in the dust receiver at the central station. The process is exactly the same in principle as when using the portable dustless card stripper, which is regularly employed on thousands of cards, but the vacuum apparatus and dust receiver are stationary and at a central station, instead of portable and moved from card to card.

Combination Weft Straightener and Compensator

A new device designed to straighten the weft of piece goods, whether wool, cotton, or silk, without any attention on the part of an employe, has been brought out by H. W. Butterworth & Sons Co., Philadelphia. It is called the "L. & L." Combination Weft Straightener and Compensator.

The advantages claimed for the machine are many. Among these is noted the practical elimination of the human element in the operation of straightening the weft in piece goods of any description. It not only re-



COMBINATION WEFT STRAIGHTENER AND COMPENSATOR

places the labor needed for this work, but also does the work of the usual compensator more satisfactorily, and yet takes up no more room. Its operation is speedy, and only requires the occasional attention of a boy or girl, or an operator of another machine, to keep it regulated, so simple is its character.

The advantage of requiring no ex-

pert attention is in itself enough to arouse interest. However, it is claimed that it will prevent seconds in such fabrics as ginghams, chambrays, Scotch plaids, and other lines requiring the pattern to be perfectly straight when finished, which is another economy feature. The use of this machine also insures an even tearing of goods, such as sheeting and pillow casing, which must afterwards be hemmed, and this is an advantage in offering these goods for retail.

The machine itself is simple in construction; there are no gears or pinions to get out of order, and all parts are visible.

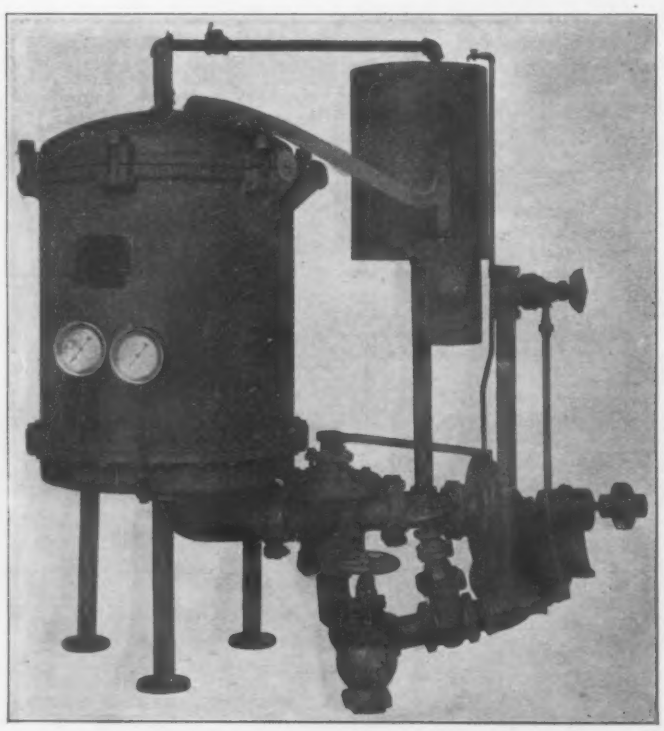
A hand wheel on one side, shown in the illustration, regulates the action of the machine. By a turn, a boy or girl or unskilled operator can give the proper adjustment when starting, and only an occasional observation is needed while it is in operation. As previously stated, it takes no more room than the compensator it supplants. It can be placed anywhere, and is not attached to, or dependent upon, any other machine.

Franklin Process Jack Spool and Top Dyeing Machines

The Franklin process of yarn dyeing, developed by the Franklin Process Co., Providence, R. I., has been extended during the year to the dyeing of yarns in jack spool packages and to the dyeing of tops.

For the jack spool process the yarn, 40 or 50 ends, or as many as desired, is wound on metallic jack spools with perforated core and heads, and the package is placed in the machine, the dye solution passing back and forth through the yarn.

A relatively short time is required for the dyeing operation, and dyed spools inspected by the writer left nothing to be desired in evenness, both of ends across the length of the spool, and in cross section through its diameter. For dyeing blacks and dark shades, an especially coated iron machine is used; for colors an acid-resisting bronze machine is built. Both constructions are practically indestructible, and repairs should be very slight.



FRANKLIN PROCESS JACK SPOOL DYEING MACHINE OF 100-POUND CAPACITY

The illustration shows a Franklin jack spool dyeing machine of 100 pound capacity. It will be noted that the machine is similar in principle to the regular Franklin yarn dyeing machines which are being used in many mills for dyeing material in other forms. It is self-contained and consists essentially of a dyeing kier, an expansion tank for feeding in the various solutions, a centrifugal pump, with simple and compact piping. The liquor is passed from the core of the package outward during a part of the dyeing operation and from the outside to the core during the rest of the dyeing period, its course being changed by the simple turning of one valve.

The floor space occupied is small for the capacity, and as the labor of operating, after loading, is confined to turning the valve controlling the course of the liquor every five to ten minutes, watching the bleed pipe, and the thermometer at times, and adding water and chemicals when needed, the labor cost is reduced.

TOP DYEING MACHINE

The new Franklin top dyeing machine has recently been placed on the market, and is being adopted by some of the largest worsted mills in the country. It is stated to have effected all the economies as regards space occupied, small amount of steam and drugs used, labor of handling material and reduced total cost of dyeing that are characteristic of other Franklin process machines.

PROCESS ADAPTED TO WORK

In top dyeing the material remains stationary while the liquor is forced through it. This is the principle on which the Franklin process has been developed, so it was a comparatively simple matter to extend the system to include top dyeing. It is claimed there is no tendency toward felting, and the work is not so exacting as the even dyeing of yarns for weaving and knitting. Having solved the latter and more difficult problem, it remained only to develop the proper sizes of machines and methods of holding the material to give the top dyeing machine so urgently needed.

The machine will color upward of 800 pounds to a batch, and three batches can be gotten out in a day. There are eight holders in the machine, on each of which twelve tops are assembled, and as the tops are wound on the Franklin spring there is no disturbance of the top, and the material is easily and evenly compressed on the holder.

ECONOMICAL DYEING

The manufacturers call attention to the following claims for the machine: For mills whose tops are dyed Government khaki, it will probably pay for itself in ten days' operation if their work is now job dyed. As in all Franklin dyeing machines, it is self-contained, and consists essentially of a dying kier, an expansion tank for feeding in the various solutions, a centrifugal pump, with simple and compact piping. It has a positive two-way circulation of the liquor through the tops by the centrifugal pump.

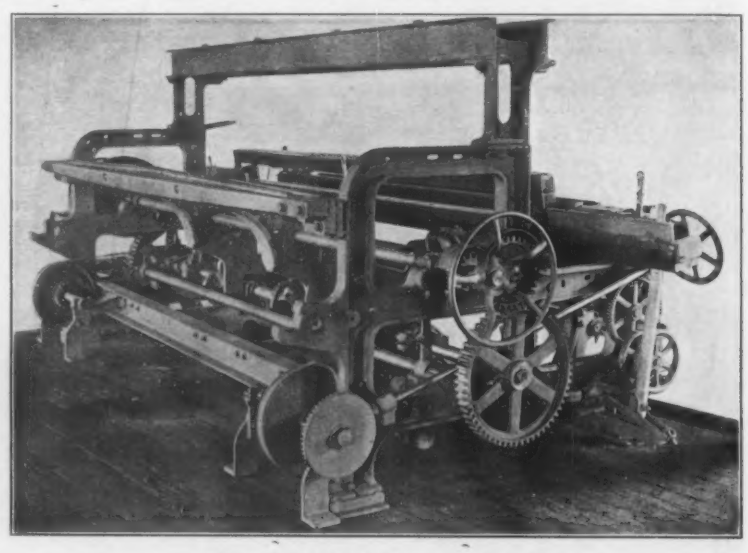
As in other Franklin machines an important economy is effected in the very short dye bath, there being approximately a gallon of dye liquor to each pound of material, which results in a saving in drugs. The conditions under which dyeings are accomplished are very exact, so that succeeding batches are remarkably uniform. The amount of steam used is relatively small, and the dyehouse is free from escaping steam.

Mason Heavy Duck Loom

A new Mason heavy duck loom of the Whitin model that has been brought out by the Mason Machine Works, Taunton, Mass. It is built for weaving heavy duck, tire fabric and similar cloths. The construction is very rigid with heavy arch, end frames and center supports to reduce harmful vibration of parts. The lay is well balanced with weight and power distributed to give a smooth running action on even the heaviest fabrics of the type for which the loom is built. The various motions are constructed for durability under the strains of heavy work and for convenience in operation, which means increased efficiency of weavers. The new loom has passed through the experimental stage, and is in daily operation in several mills in the United States.

DETAILS OF CONSTRUCTION

The heavy framing is supplemented by center supports forming intermediate bearings for shafts and rolls, to reduce the harmful vibration which causes breakages and stoppage for fixing. The outboard bearing on the driving end further stabilizes the loom and gives a smooth running machine. The lay is strongly reinforced with angle irons and steel race plates, working on cast steel lay swords and rigid rock shaft with ample bearings. Beating-up in weaving is an unbalanced motion, and on heavy picked goods, particularly, each detail of the parts comprising this motion must be worked out with scientific precision. Every attention has been paid to this feature, also to the picking motion, which is of the modified bat-wing type, and is provided with ample adjustment for obtaining the desired pick.



REAR VIEW, MASON HEAVY DUCK LOOM

The harness motion is operated from the bottom shaft with two or more sets of cams, located between supports according to the width of the loom. The double arch is constructed of heavy iron beams, and is capable of carrying the greatest strains that can be put upon it in weaving. Adjustable turn buckles are supplied for the harness straps, giving accurate adjustment of the harnesses.

TAKE-UP POSITIVELY DRIVEN

The take-up motion is positively driven from the cam shaft and takes up on every pick, which has proved to give absolute satisfaction. The take-up rolls can be of fluted iron; while on some classes of goods a single take-up roll with the common perforated steel covering gives good results. The details of the take-up rolls and the location of the cloth roll that are recommended must depend upon the nature of the cloth being woven and on local conditions. Provision is made for winding a roll of cloth at the front of the loom, while other methods of winding up the cloth that have been provided for locate the cloth roll on top of the loom framing, or in front of the loom, back of the weaver, each of these methods having its own separate winding mechanism.

This loom can be built for standard tire fabrics in 84-inch and 90-inch widths, and for the different weights of duck from 20 inches wide to 170 inches wide.

The Schwartz Automatic Electric Guider

A new automatic electric guider for straight and swing tenter frames, patented by L. H. A. Schwartz, has been brought out by L. H. A. Schwartz & Co., 40 Central street, Boston, Mass., which is of interest. The apparatus is extremely simple and works on the principle of sliding the wings of the tenter to meet the cloth as it moves from side to side or varies in width, instead of moving the cloth to meet the wings of the tenter. By this arrangement the wings keep in constant close touch with

the selvages, the cloth running perfectly free.

In attaching the device the screw by which the wings of the tenter frame are moved from side to side is cut in the middle, allowing each wing to act independently of the other by its own screw. As the device is entirely automatic, the hand wheels, by which the wings are set ordinarily, are removed and gears substituted. Beneath the gears and geared to them are hung small reversible motors of about one-eighth h.p., which are wire-connected to the feelers on each side of the frame.

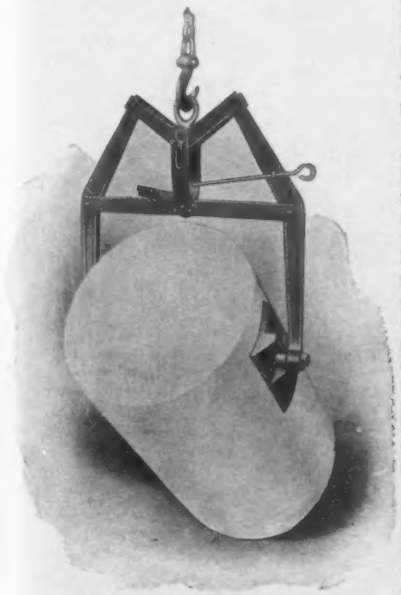
Automatic Dissolver for Caustic Soda

An apparatus designed to eliminate the usual dangers and difficulties connected with preparation of caustic solutions in mercerizing, bleaching and finishing plants, which is manufactured by The Walter E. Lummus Co., 173 Milk street, Boston, is shown in the accompanying illustration. This dissolver is entirely automatic and offers many decided improvements over the methods generally employed, involving the use of steam or compressed air, mechanical agitation and often the troublesome breaking up of the fused cakes of caustic with the accompanying danger of serious burns to employes.

The operation of the apparatus is extremely simple; as adapted to fused caustic soda, the thin iron drums are stripped from the cakes, which are placed on the grid in the hopper, as shown in the cut; the tank and dissolver is then filled with clear cold water so that the cakes are submerged to a depth of about six inches. The solution of the caustic starts at once and is maintained by a patented system of circulation which continues without attention until the cakes are completely dissolved.

WORKS WITHOUT ATTENTION

This apparatus was devised by a superintendent of a large chemical plant who was confronted with the necessity of preparing large amounts of caustic solution at regular intervals and who was keenly alive to the dangers and disagreeable features of this class of work.



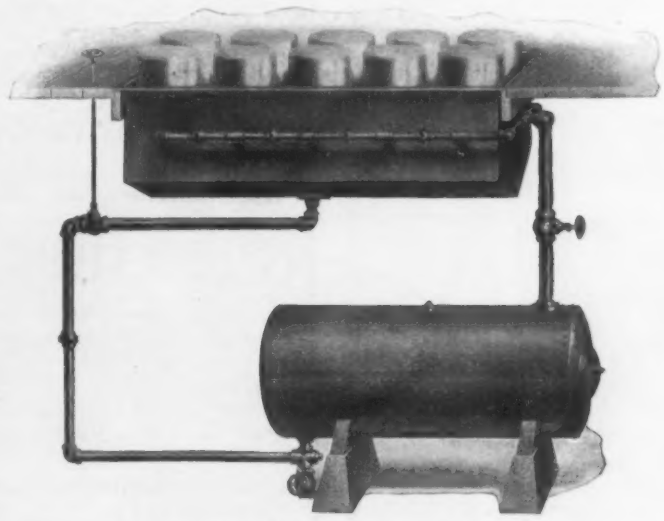
LUMMUS LIFTING TONGS FOR DANGEROUS MATERIALS

Solutions of any required strength can be made without the use of steam or compressed air; there are no moving parts requiring power for their operation and liable to breakage. No attention is necessary other than the initial charging of the apparatus, which will automatically effect the complete solution of the caustic in about five hours.

The dissolver can also be charged at night with the assurance that the solution will be ready for use in the morning. For hot solutions a thermo syphon attachment is provided. The device is manufactured in different sizes and is claimed to be a money saver.

LUMMUS LIFTING TONGS

The Lummus tongs were designed to overcome the danger and inconvenience incidental to lifting and transferring



AUTOMATIC DISSOLVER FOR CAUSTIC SODA

cakes or lumps of fused chemicals, such as drum caustic soda. The usual method of simply placing a chain around the cake is unsatisfactory in that it involves more or less handling, and numerous accidents to employes have been the direct result of this dangerous practice.

The wide curved and corrugated jaws of the Lummus tongs provide a gripping contact that will neither slip nor shatter the cake, and the swivel feature permits picking up or placing the cylindrical cakes in either horizontal or vertical position. This is indispensable especially in the case of heavy, slippery material that cannot be touched with the hand nor gripped by ordinary means.

Toe Positioning Device on Paramount Forms

Every hosiery mill man knows how essentially important it is for his goods to present an attractive appearance when finished and endeavors to attain this result even at the expense and delay consequent on reboarding. When seamless hosiery is in its flattened finished condition the two gores should extend in exactly the same direction and lie one against the other; the wales should be properly positioned, and the looper's knot should not appear prominently on the surface. If these results are not accomplished to a satisfactory degree, the goods are less salable and the quantity that requires reboarding causes extra expense, confusion and dissatisfaction.

In a large measure the finished appearance of the stocking depends upon its careful positioning on the form, and with the object of making it easier for the boarder to determine the correct position, the Paramount Hosiery Form Drying Co., Chicago, has developed a toe positioning device for Paramount forms, which has proved to give better results and reduce the expense of reboarding even where the most experienced or careful operators are not available. It provides for finishing the stocking with the gores definitely aligned, the wales straight and parallel. A gore positioning groove or slot is cut at each side of the toe of the form, and the rear end of each groove is widened to provide a larger recess for the looper's knot. Prominent edges are left on the slots for the purpose of guiding the boarder's fingers and enabling her to accurately position the stocking while working rapidly.

NEW SINGLE PIPE TABLE

A new single pipe table has just been perfected for half-hose and children's ribbed goods, which is only 17 inches wide, making a great saving in floor space and steam, and facilitating the work of the operator. The new table for ladies' goods is only 22 inches wide, and the position of the forms on this table saves several inches in the reach of the operator, making it easy for women or boys of short stature to operate same.

Dial Reading Scale, Portable Type

The American Kron Scale Co., New York, have perfected a portable dial reading springless scale which can be moved from one part of the plant to another over rough roads and runways if necessary. This scale is so mechanically built that it can receive very rough usage without fear of injuring it. Consistent with their stand since the inception of their business, while they have materially departed from the general construction of their first mechanism, they still eliminate springs of any character. Several textile mills have manifested an interest in knowing more about the portable type reading scale and at the present time it is being given a test under the most severe conditions that a scale is called upon to stand up under.

"HOFF-MAN" IMPROVED FFF STANDARD PRESS

Improved FFF Standard Underwear Press

The United States Hoffman Co., Syracuse, N. Y., brought out a new press for knitting mills which they call the Improved FFF Standard. It has a capacity double that of the old style FFF machine and combines with this important point of larger production advantages in operation and quality of finish. It is even simpler than the older machine, and there are no complicated mechanisms to get out of order or wear out quickly.

The principle upon which the Hoffman machines have been built, and which has resulted in their extensive use in the knitting industry, is that of applying hot dry steam direct to the garment. This direct application of steam gives the fabric a lofty appearance, or by a certain adjustment, which is provided, a hard and flat finish can be secured.

Previous to the development of this new press the large machine commonly installed in large knitting mills was equipped with two heavy bucks, one on each side of the press, each weighing in the neighborhood of 500 pounds. These had to be pushed into pressing position, and the handling of such a heavy weight cut down the daily production. In the new machine this method of construction is eliminated. There is but one buck on the Improved FFF Standard, it remaining directly under the head of the machine.

The operator, instead of pushing a heavy buck in and out, has only a light frame known as a garment conveyor, weighing in the neighborhood of 12 pounds, which slides in from the wooden table, and is loaded with either two union suits, pressed full length, or from ten to twelve garments, pressed folded. One operator is pressing while the one on the opposite side is loading the conveyor.

Moving the foot pedal forward with foot pressure raises this lower buck and conveyor to pressing position, and in the upward movement, steam is automatically applied to the garment. Then within a few seconds, the same foot pedal is pressed in a backward position, when buck and conveyor are released, the conveyor is drawn out by the operator and the garments are either stacked or boxed.

TRADE PAPCO PAPER PRODUCTS CO. GUMMED TAPE. MOISTENING MACHINES. STICKERS ATLANTA, GA. MARK

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"PAPCO BRAND" is the only SPECIALLY MANUFACTURED SLASHER TAPE on the market.

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Let us ship you a Papco Tape Moistening Machine and coil of Papco Slasher Tape (state width desired) for sample. Return at our expense if not satisfactory.

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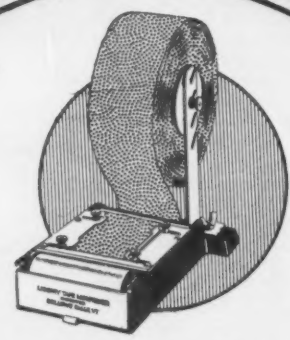
67 Walton Street Atlanta, Georgia



Economical Packing

For sealing fibre and corrugated cartons a strong, uniformly adhesive tape is most economical. It can also be used to advantage in packaging textile goods in dozens before they are put in the shipping cases.

LIBERTY TAPE

is made of strong, Nibroc Kraft paper. It exceeds all railroad requirements for strength. Imprinted with your name or trademark, at a slight additional cost, it serves as an advertising label and as a seal that discourages theft. *Send for free samples of Liberty Tape* and estimate for your tape requirements.

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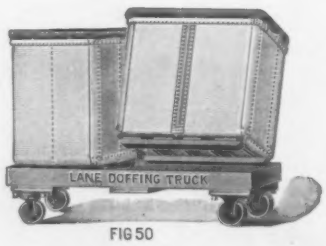

FIG 50

LANE CANVAS BASKETS BOXES *and* TRUCKS

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The buck or lower pressing surface of this machine is so constructed as to be adjustable to varying pressure, depending upon the class of goods to be pressed, and any pressure desired can be obtained with this adjustment. Any quantity of steam can be applied to the garment, depending upon the amount required for the class of goods being processed.

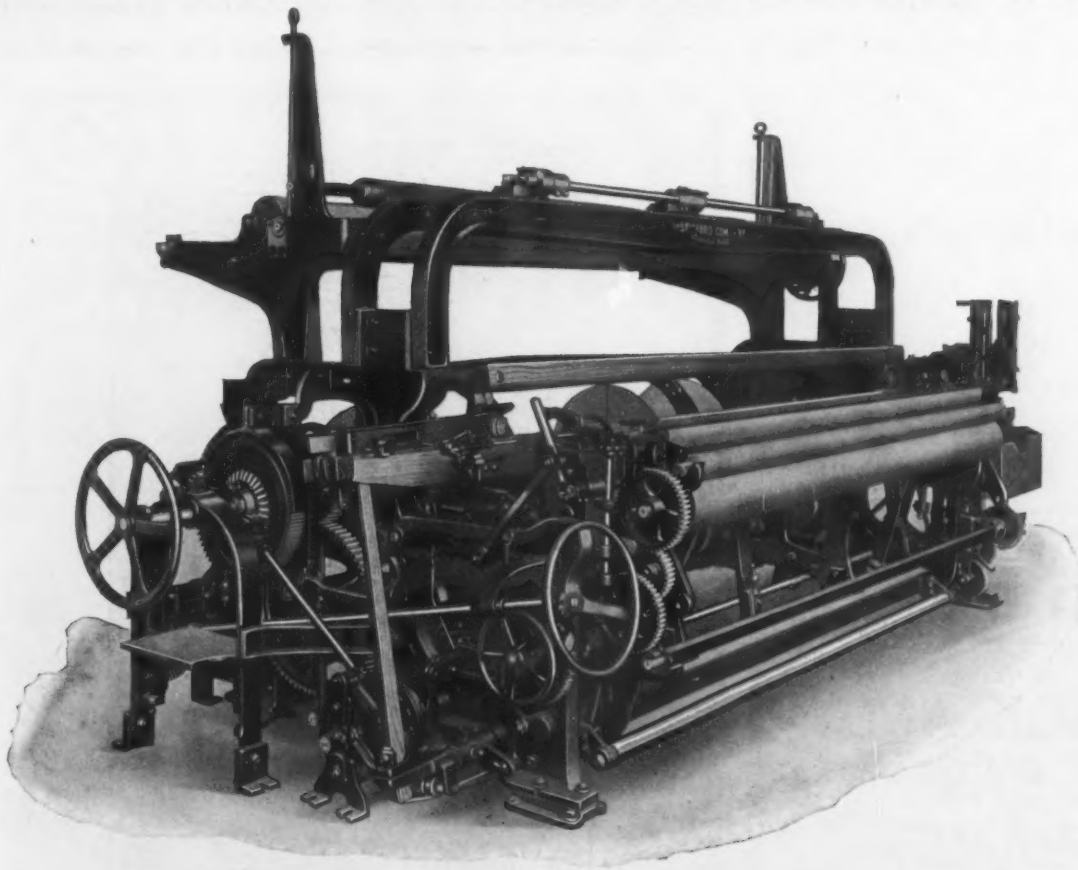
The machine is adapted for all classes of undergarment finishing. No strength is required and there is nothing to do except load the frame, slide it into pressing position and touch the foot pedal, the machine completing the pressing operation.

Stafford Tire Fabric Loom

The latest Stafford product in automatic looms is the tire fabric model, shown in the accompanying cut. This loom has been developed for the special purpose of weaving high grade tire fabric and embodies all improvements and refinements of construction necessary to turn out a fabric of this character of the very highest quality. It is arranged to weave a roll 24 inches in diameter, of about 250 yards, with cloth roll in front of loom, or by running the cloth underneath the loom and winding up on top a roll of fully 600 yards can be made.

The loom shown in the illustration is arranged for motor drive, with drive compounded, and has a heavy shaft running across the loom driving at both ends. It is equipped with a band friction let-off of an improved type, with hand wheel in front of loom for releasing the tension on the beam, and a small wheel immediately above this hand wheel for regulating tension of let-off.

The bottom shaft carries three sets of harness cams, the warp beam is arranged with outside and inside heads and tie rods, the lay is heavily reinforced, all gears are extra heavy, the loom frame is unusually strong and well braced, and the complete machine, 84-inch cloth space, weighs approximately 7,000 pounds. It is equipped with the "Ideal" Stafford automatic shuttle changing motion, with magazine for several shuttles 19 x 2¼ x 1 15/16.



STAFFORD LOOM, AUTOMATIC TIRE FABRIC MODEL

A 20-Spindle Ball Winder

Several new machines have been brought out by the Franklin Machine Co., Providence, R. I., including a 20-spindle ball winder, thread polishing machines, and a lace tipping machine. The ball winder is for the purpose of winding cord or yarn into balls. It is adapted for cotton, silk and worsted.

The gauge between spindles is 6 in., and a ball can be wound up to 4½ in. in diameter. Ordinarily flyers are furnished to take a 3-in. ball. The machine is very strongly built, having channel iron girts between sides. The swing rail is supported in the middle by brackets attached to girts which support the flyer spindles. Cut gears are used in most cases. If wanted, a sheet iron casing can be supplied to run between the flyer girt and wooden tray in front; this will prevent the paper cones from falling to the floor. In some cases a casing for all exposed gears is supplied.

The speed of the flyer for different yarns is as follows:

Cotton	1,000 R. P. M.
Artificial silk	800 R. P. M.
Pure silk	825 R. P. M.
Worsted	225 R. P. M.

The time required to make 20 balls of cotton is 2¾ minutes. The machine is 13 ft. 6 in. by 4 ft. 10 in.

THREAD POLISHING MACHINES

A number of improvements have been made by the Franklin Machine Co., Providence, R. I., in their thread dressing equipment which is used for processing threads for harnesses, shoes, shoe laces, etc., and for silk threads. Three styles of brush frames are made, as follows: Single brush dresser for threads equivalent to 16s 4-ply and finer; two-brush machine for threads from 16s 4-ply up to 10s 10-ply and equivalent sizes, and a three-brush machine for coarser threads. A 98-spindle take-up to wind the yarn on spools after it has passed through the brush frames is also built.

LACE TIPPING MACHINE

The "Franklin Tipper," puts perforated tips on laces and tapes of any kind. Any lace up to 144 in. in length can be measured and tin for the tip up to 1¾ in. in width can be used. The tip is made double, which requires cutting in the center.

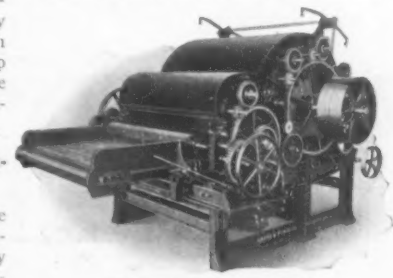
Improved Waste Puller and Redesigned Rag Shredder

Many improvements are noted in the improved waste puller and the redesigned rag shredder brought out by Smith & Furbush Machine Co., Philadelphia.

In the waste puller the design of the driving arrangement for the doffer and delivery rolls has been improved so that an open belt is used instead of a crossed belt. The receiving pulleys for this drive have been mounted on a short shaft in an individual housing equipped with self-aligning bearings and their well known type of self-locking belt shifter has been provided for shifting the belt.

The method of changing the gear for the various speeds of the delivery rolls and doffer has been simplified also. It is no longer necessary to take out the shaft to change the change gear. The gear is now carried on the projecting end of the shaft referred to above and merely requires that the set screw be loosened and the gear taken off. Another one is then slipped on and the screw tightened. The drive is provided with an intermediate gear, which is carried on a radial stud plate, and swings in or out to suit the change gear being used, then bolted fast.

They have increased the strength of the stud plates where any semblance of weakness appeared. This change required a new plate to carry the feed roll stop motion. This is now made in one piece instead of two, so that the parts are held more firmly together and cannot get away. Good, strong adjusting set screws have also been put in the chain tightener stud plates, so that the chains can be kept at the proper tension with very little trouble.



IMPROVED RAG SHREDDER

The pins on several of the lags on the main cylinder have been extended clear out to the edge, so that they may clear away any threads which may gather on the ends of the workers or strippers.

The clothing on the workers and strippers has proved to be considerably superior to the clothing on the older type of machines in that the teeth, being of staple form, cannot be pulled out of the lags, which are steel in the present case against wood in the older types. They are also prepared to supply the round sharp pins in steel-faced wood lags, in place of their cockspur type of tooth.

RAG SHREDDER

The redesigned rag shredder is used for shredding into thread waste such materials as cotton rags or clippings of light or medium weight. Among the more common of these are shirtings, tailor clips, knit underwear or hosiery clips, ginghams, plaids, tickings, denims, turkish toweling, lace curtains, netting or similar fabrics. The stock is usually of loose or open weave, as this class of rags will make better waste than those that are closely or tightly woven. The latter will usually shred into short threads.

IMPROVED FEATURES

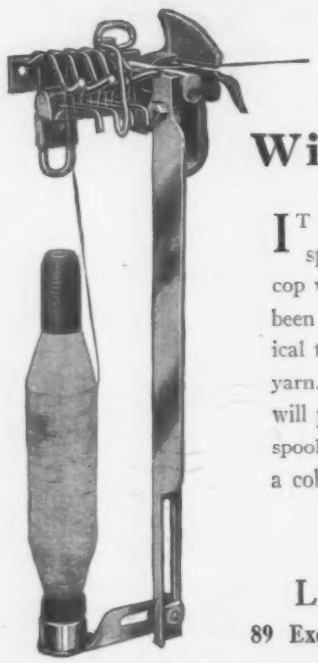
Among the many new features and improvements which are contained in the new shredder, the following are the most noticeable: The design is up-to-date. The frame is 8 inches higher, giving a more convenient height for feeding and allowing a greater accumulation of finished stock, eliminating the necessity of blocking-up. The transfer stripper is set higher, increased in diameter, equipped with brass bushed, ring oiling bearings and carried so that, in case of a chunk passing under it, the roll may jump clear of both the breast cylinder and main cylinder, avoiding damage.

MACHINE RUNS STEADIER

All chain drives have been eliminated, gears being substituted in most cases. The present drives enable the machine to run steadier and more quietly, wasting less power. In the drive for the feed rolls they are gearing through a pair of friction discs lined with leather washers and controlled as to pressure by suitable springs and bolts. In case any large wad or lump gets into the feedrolls, the disc slips and prevents damage. When such a choke up occurs, all that is necessary is to throw out the clutch and turn the feed rolls back by means of a large handwheel now provided on the end of the feed roll journal. A ratchet and spring then acts to prevent the breast cylinder from jerking the rolls forward if it should

L.T. HOUGHTON'S SPECIALTIES for Cotton Spinning

A Practical Tension Device for Spooling and Winding Yarn



IT is needless to tell the practical spinner the advantages of the cop wind for warp yarn. What has been needed is a practical, economical tension for spooling cop wound yarn. The cut shows a device that will provide the tension desired, for spooling any number of yarn; from a cobweb to a fishline.

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LOOM REEDS

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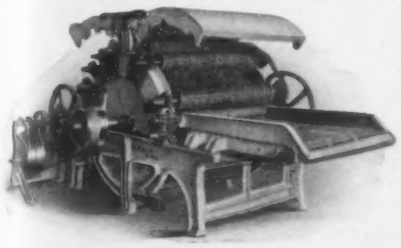
ASK FOR SAMPLES

catch hold of the stock while the clutch is out. The clutch lever has been lengthened and strengthened, and provided with more power spring and better means of holding the clutch in or



IMPROVED WASTE PULLER

out. These changes embody the best practices as determined by the manufacturers' experience in building this class of machinery.

Air Wash Filter

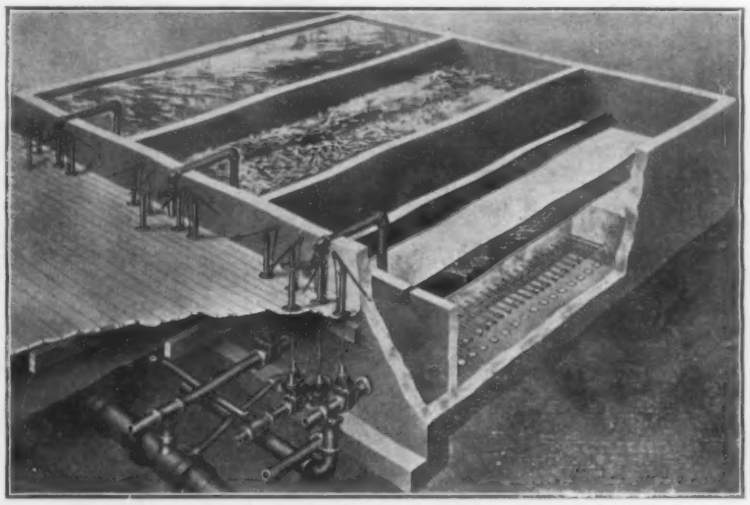
The accompanying cut shows the latest developments of the air wash filter as employed by Hungerford & Terry, Inc., Philadelphia. In the illustration the right hand filter is shown partly in section, the middle one during the washing process, and the farthest one shows the filter full of water and in operation. These filters are placed in rectangular, concrete basins. On the floor of each basin is placed the piping system for collecting the filtered water from the bottom of the filter bed.

So that the sand will not flow out of the filter bed and enter this piping system the water is first compelled to pass through a series of strainers which separate the filtered water from the sand, but do not permit the sand to pass through them. These strainers are of the Hungerford type and are too well known to need descriptions.

The filter bed proper, which consists of a specially prepared sand, is placed over the strainers to a depth of four feet. Near the bottom of the sand bed are placed a series of perforated pipes which are employed for the distribution of air underneath the sand bed during the washing process.

Above the filter bed is placed the wash-water troughs, devices for collecting the wash-water and at the same time causing any sand which may attempt to follow the wash water out to be automatically returned to the filter.

On the exterior are the necessary valves for performing the various offices of washing, filtering and filtering-to-waste. These, where possible, are of the quick opening type so that the various functions of the filter can be performed in the minimum period of time.



HUNGERFORD & TERRY GRAVITY FILTER PLANT—AIR WASH TYPE

In operation the filter is filled with water to within a few inches of the top of the concrete basin. This gives a depth of approximately 3½ feet of water over the sand. The water percolates down through the sand at a comparatively high rate of speed, passing through the slots in the strainers, enters the collecting pipes and is by them discharged into the main which leads through the bottom of the filter, and which in its turn carries the filtered water to the exterior of the filter where it can either be discharged into a clear water reservoir or into a filtered water collecting main. This completes the filtration process.

When the filter becomes dirty, or to express the condition a little more explicitly, when the spaces between the sand grains have become filled with solid particles, it is then necessary to wash the filter.

Washing is effected by pumping water, either filtered, settled or raw, through the wash-water pipe into the underside of the filter. This water enters the distributing system and passes out through the slate in the strainers or sand valves. One of the functions of these sand valves is to distribute this wash water underneath the bed with absolute uniformity.

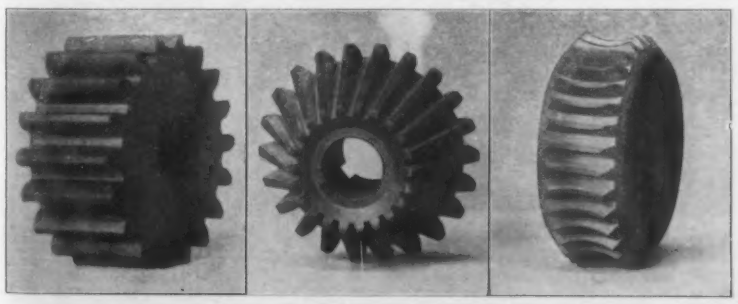
After having left the strainers the water passes up through the filter bed with sufficient velocity to produce an active motion of all of the sand grains. These sand grains rubbing against each other loosen the impurities rapidly so that the upward current of water can carry them to the surface. At the same time that this is taking place air under a pressure of three pounds or more is delivered under the sand bed through the perforated air pipes. This produces still further agitation of the sand grains so that in from three to four minutes all of the foreign suspended matter has been loosened from the sand grains and subsequently washed to the surface of the filter plant.

This dirty water is collected by the wash-water troughs and delivered directly into the sewer. As considerable sand is carried up by the air, the wash-water troughs are especially designed so that the wash water has to pass through a zone where there is no air in order that the sand may fall back to the bed and not be carried out through the drain.

As soon as the filter bed is cleaned the wash valve is closed and the raw water inlet valve opened. This permits raw water to flow upon the surface of the bed and fill the filter up to its working level.

The first water delivered by a filter after washing is not up to the standard, particularly if raw water has been used for this purpose. To prevent water of an inferior quality from entering the main a connection is provided whereby the first filtered water is by-passed into the drain. It takes about two minutes for the filter bed to become properly packed and for the improperly filtered water to be drawn from the bed. When this is done the filter-to-waste valve is closed and the filtered water valve opened. This completes the cycle of operation.

The advantages of this type of filter are its durability, thoroughness of the washing process, the simplicity of operation and saving of space.



PLAIN SPUR GEAR AND TWO SPECIMENS OF GEARS MADE FROM BAKELITE-MICARTA-D

Non-Metallic Gears and Pinions

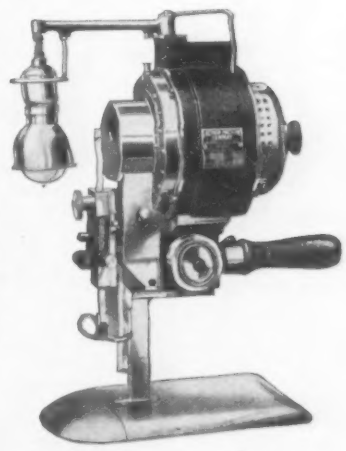
A non-metallic gear material which succesfully meets textile mill requirements has been reecntly placed on the market by the Westinghouse Electric & Mfg. Company of East Pittsburg, Pa., under the trade name of Bakelite Micarta-D. This material is a product of heavy duck bonded together with Bakelite by heating while under an enormous pressure, and is practically as strong as cast iron. It is not affected by atmospheric changes, is vermin and rodent proof, and may be stored indefinitely without shrinking or other deterioration. It can be used for gears that have to operate in oil, without any signs of swelling, and is self-supporting. Gears made of this material sometimes require shrouds or end plates in order to strengthen the keyway. These end plates, when required, need extend only to the root of the teeth. It is, therefore, possible to apply Bakelite Micarta-D gears of small width of face.

VARIETY OF APPLICATIONS

The structural and wearing qualities of Bakelite Micarta-D make it suitable for a large variety of applications. The long life of gears made from it has been proven under most severe service conditions with fibre stresses up to 5,000 lbs. per square inch. Textile motors applied to the drive of looms and spinning frames have been equipped with such gears with excellent results. In mining, foundry, and paper mill applications they are proving highly satisfactory.

Eastman Cutters

The illustrations show the latest

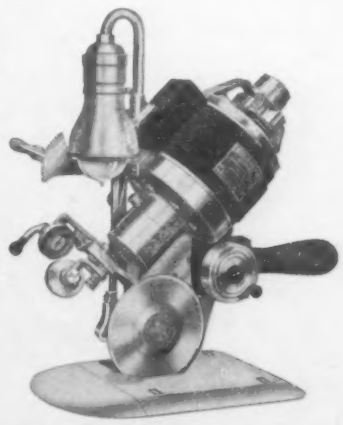


STRAIGHT KNIFE CUTTER

model straight knife cutter and the latest model rotary machine brought out by the Eastman Machine Co., Buffalo, N. Y. They have greater speed, more power and higher efficiency than previous models and are a result of twenty years' experience in building electric cloth cutting machines exclusively. The latest advances are along the lines of simplicity and interchangability of parts. The characteristic feature of simplicity has been carried to the point where these machines cannot be considered in any way complicated. High class construction not only permits higher sped, but makes for reliability and service, and in the refinements found in these latest models every piece, forging, bolt and screw will be found to be of the very best material and turned out by the highest grade of workmen.

The machines are perfectly balanced to prevent vibration and the design ensures easy and rapid operation. In the straight knife machine the motor develops practically ½ h.p., which is more power than it is ever necessary to use. The crank shaft mechanism is made with roller and ball bearings and the centrifugal fed oiling system is used, oil being forced into the crank shaft bearing every revolution of the motor. All moving parts are enclosed.

The rotary machine is so constructed that when the knife wears out it may be lowered into the plate so as to maintain



ROTARY MACHINE

the same position between the cutting edge and knife slot in the plate or base of machine. This adjustment gives the knife long life.

ESTABLISHED SEVENTEEN HUNDRED NINETY-ONE THE ONE HUNDRED AND TWENTY-SIXTH YEAR

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Means: — that the greatest net result obtainable will come to hand from the sale of a manufacturing property.

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That the business of the systematic preparation of properties for absolute auction sale and the thorough and effective publicity of such sales has become of as much importance in the successful liquidation of large manufacturing properties as has the clearing house system to the national banks.

Entire Transaction — From Start to Finish — Taken in Charge

Carpet Mills Changed Product

(*Continued from page 325*)

had experienced so much difficulty in securing the necessary warps from the South and other troubles that he gave it up. Another manufacturer of jute ingrain carpets and rugs had also made the experiment, but had not met with success so had abandoned the plan for the present. He is now running about 90 per cent of his machinery on his regular lines of jute ingrains, as there is apparently good business on these goods.

EXPERIMENT IN OTHER LINES

A manufacturer of velvet goods stated he had experimented with duck but had not been successful, and he was now running about 65 per cent of his 30 looms on his regular goods. One mill which is now running fairly well on its regular lines had also tried to make duck, but the manufacturer declared conditions were not favorable for the expense involved in the required changes. He stated his company was only too willing to work for the Government on a basis which might even return no profit whatsoever, but that he did not think it a fair proposition to ask him to operate at an absolute loss which would have been entailed if he had produced duck. A manufacturer operating a plant of almost 75 looms stated they were now running only about 50 per cent of their machinery. He reported the carpet trade generally as poor, with the possible exception of the cheaper lines of ingrains, and tapestry Brussels. This mill had also experimented with duck, and was expecting in the future to receive orders for this class of goods, and that their chief motive for accepting this work was to keep their organization together. One manufacturer operating about 150 looms stated they were now running only about 50 per cent of their equipment, and this almost entirely on Axminster goods, with their looms on velvets and tapestry lines stopped. They had made samples of duck, but various conditions had prevented their being able to undertake this work. For example, they had experienced difficulty in securing the proper help due to war conditions and the high wages paid in munition and other plants. The high cost of materials in yarns and dyes made it almost impossible to operate because of the necessarily advanced prices it was necessary to ask for his lines.

BOTH DUCK AND BLANKETS

Six mills, most of them of good size, reported a production of both blankets and duck in addition to a small percentage of machinery on their regular lines of rugs and carpets. One manufacturer reported that his 50 looms were about evenly divided between rugs and carpets on the one hand and on the other blankets and duck. Another mill of 120 looms reported about 60 per cent of their machinery producing blankets and duck, with the balance running in a desultory fashion on lines of Axminsters and ingrains. One manufacturer reported over 50 per cent of his 20 or more broad looms on blankets while almost all of his narrow looms were on duck. A mill reported rather a good business on wool fiber rugs, but even here they were running 50 per cent of their 40 looms on blankets and duck. One large plant was reported at present running about 40 per cent of their machinery on Government goods, including blankets, duck and uniform cloth, but that as the balance of their machinery was not running any too well on regular lines, they expected to increase this extraneous product still more until it would reach at least 70 per cent of their loom capacity. Still another prominent manufacturer reported only about 10 per cent of his machinery engaged on floor coverings, and that almost entirely devoted to Axminsters, while about 80 per cent of his equipment was engaged on blankets, duck, uniform cloth, mosquito netting, etc. The above conditions indicate only too well how limited is the stock of carpets and rugs which will be offered to the trade.

RUG SCARCITY EXPECTED

One manufacturer stated he anticipates a scarcity of rugs especially which will affect the small dealer probably more than any other factor. In the past the small dealer throughout the country handling rugs and similar lines has usually found little difficulty in securing these goods when he wanted them, and the conditions under which much of this business has been done, were not always satisfactory. However, a year from now, this manufacturer predicted that the small dealer would have the unusual experience of being compelled to beg for rugs, as manufacturers would be more inclined to favor the larger trade which would offer a more satisfactory business.

OTHER MILLS LIMITED

As still further indication of the limited production of floor coverings, a large majority of the twenty-one mills canvassed that are not engaged on the manufacture of blankets, duck, or other outside fabrics, are operating only a part of their equipment, and are not able to show a full production of their regular lines. In fact, there were few mills which reported all their looms in operation, and these largely on cheaper goods. One mill of over 500 looms is running only 30 per cent of its machinery; another mill making ingrains chiefly, reported only about one-sixth of its 50 looms in operation; still another manufacturer reported 40 per cent of his 60 looms running on Axminsters, while in another plant 80 per cent of its 30 looms were operating on art squares. The other mills also showed a varying condition, indicating an important reduction in normal production, all tending to confirm the statements made by many leading factors that there was little chance for an overproduction in floor coverings.

VARIOUS OTHER FACTORS

Among the mills in Philadelphia engaged in the manufacture of carpet yarns, reports would seem to indicate that over 50 per cent of this machinery is now engaged in producing blanket yarns. This situation, it is stated, is due to the limited demand for carpet yarns owing to the high prices necessitated by the greatly advanced costs in raw material. Naturally with the increased demand for yarns for blankets mills diverted what machinery they could to these yarns in order to take the business offered. Those in close touch with the carpet and rug trade report that it is only the cheaper lines which offer any chance for business. Velvet lines are by no means active, although Axminster goods are apparently one of the best features. Woolen faced goods seem to enjoy an advantage over worsted goods which are seriously handicapped by the high cost of yarns. For example, on the popular 16s two ply for ingrains, as high as $1.15 has been quoted, which, of course, hindered the better grades of ingrain from securing much business.

Among the most successful lines are lower grade goods, using a jute filling yarn, or a paper fiber yarn. Wiltons and tapestry lines are reported showing only scattered activity, showing the tendency toward cheaper lines. At the same time there are several factors who are inclined to look for a continuation of the present economy in the purchase of floor coverings. In fact, one prominent manufacturer declared he never expects to see a resumption of the former big business which has been enjoyed, on carpets and rugs especially. His belief is that the experiences of this war and the tendency to spend less and to exercise the greatest possible economy will tend to show the public how much they do not really need. This sentiment must necessarily be felt in all lines, and consequently will have its effect upon the rug and carpet trade. However, this is something which the future alone can answer. Many factors declare that there must be a floor covering of some kind used, and even if the effort is made to secure the most reasonable product, both in price and actual wear, they must eventually be replaced.

It is sufficient to note the present decreased production in these products. This condition, it is also alleged, is to be found elsewhere in the country. Philadelphia has long been noted as a large producer of carpets and rugs for the consumption of the country. Therefore with an estimated decrease of from 60 to 70 per cent in the production of the Philadelphia carpet mills the effect upon the trade must needs be of great consequence.

Boiler Control and Coal Economy

(*Continued from page 355*)

heat should cease. This point is mentioned for the reason that a plant carried the economy to this point.

A CO_2 recorder on a boiler accomplishes two results, efficient coal burning and proper maintenance of all parts of boiler, consisting of the combustion chamber, side walls, clean-out doors and all joints between metal and brick work. It is the first step in complete unit control.

DRAFT GAGE CONTROL

Incidental to the attainment of high per cent CO_2 and proper rating of the boiler for the required demand, is the draft gage, for without it intelligent control cannot be accomplished. The knowledge of how much a damper should be opened or closed for either forced or natural draft can be obtained and this condition then maintained by the draft gage.

To know what effect the stack has with varying wind pressure and barometer, the proper guide is a draft gage placed in the stack or last pass of the boiler. The two points of importance on a natural draft boiler are those of the combustion chamber and the last pass, treating vacuum as a minus pressure. The important points on a forced draft boiler include those of the natural draft boiler and the pressure beneath the grate as well. Draft should run in amount as low as possible, maintaining required production with the limiting point that of producing an analysis of gases that approach the formation of CO_2. In the matter of control apparatus an investigation of boiler conditions may be made at a very small expense.

A simple U gage with a single tube Orsat or flue gas analyzer is practically all that is necessary for an investigation as to condition of furnace and proper operation. For permanent indication and record, however, apparatus of the other types shown are more suitable because of their permanence.

Another point of control is that of the temperature of the outgoing gases from the boiler. With the aid of efficient soot blowers and proper baffling to prevent the accumulation of soot in pockets, temperature control may be accomplished. Naturally, influencing this temperature would be by increasing or decreasing the rating, for as the greater amount of steam is developed there naturally will be a rise in temperature of the outgoing gases. Regular, efficient steam blowing of tubes will accomplish most excellent results.

PRODUCTION OF BOILER

As in all producing elements or units, the importance of knowing how much is being accomplished by a given unit is necessary. For this the steam flow meter has been developed. The production of a boiler may also be determined by the water fed to it. A not unusual method is to measure the total water delivered to a battery of boilers and to check this against the individual production of the units of the battery. Then with the coal weight a most accurate figure may be obtained as to the pounds of water evaporated per pound of coal.

An interesting chart is given at Fig. 7, showing at the left the waste of coal due to varying per cent carbon in ashes for three different coals. Compared with the wastes due to carbon in ashes are those shown at the right of the chart, due to low per cent CO_2 in gases at varying temperature. A study of this chart and utilization of the information it gives will repay one.

War Uses of Textiles

(*Continued from page 105*)

woolen committee above-mentioned were informed from time to time, or learned on their own initiative, that certain cloths which did not conform exactly to specifications had been bought by the committee of supplies, and, in view of their advisory capacity, they felt they would be held responsible should these fabrics not give the desired service in actual use. They, therefore, made it their business to see that their position in the matter was entirely clear and had the assurance of the heads of the supply committee that they would not be held responsible for anything on which they had not been consulted and which did not conform to specifications. This assurance was given by officials who made it plain that it was necessary in instances to make emergency contracts on account of the call for unusual amounts for early delivery. As an instance of this emergency ordering, a considerable quantity of cotton-warp shirting fabric is in point, while the purchase of stocks of overcoatings in the local market to be used in place of blankets is a further illustration. If any dissatisfaction with these fabrics has developed or may develop in the future, the onus is upon the officials who found it necessary to take what they could get and largely without consultation with the committee.

In the case of overcoatings, while these two were originally of all-wool, early in the war it was agreed that a construction of 25 per cent cotton and 75 per cent wool would be accepted for a 30-ounce fabric. Subsequently the committee recommended an admixture of 35 per cent of re-worked wool and 65 per cent of pure wool and eventually fabrics composed of 50 per cent wool and 50 per cent shoddy or re-worked wool were accepted. In the case of blankets the proportion that was finally agreed upon was 65 per cent pure wool and 35 per cent shoddy, no cotton being allowed.

As an interesting sidelight on the situ-

TRADE MARK REGISTERED

THISTLE BRAND

"Thistle Brand" SOLUBLE TALLOW

A mixture of a superior grade of tallow combined with vegetable oils, so blended as to be perfectly soluble and yet possessing an oily nature when in solution; will not rub dry.

PENETRATION, Because of the oily nature of a solution of "Thistle Brand" Soluble Tallow it readily penetrates the fibre, giving a more thoroughly sized, stiffer and heavier yarn.

PLIABILITY. Combined with starch, "Thistle Brand" Soluble Tallow makes an elastic-like gum that is invaluable as a size, and in the same way gives a leather-like softness to polished twines. Warps are increased in strength, do not break due to handling and brittleness, resultimg in better and increased production from the looms.

FLAKING. "Thistle Brand" Soluble Tallow prevents flaking absolutely. Incidentally an accumulation of dirt is prevented and increased weight is carried into the finished product.

RANCIDITY. "Thistle Brand" Soluble Tallow is antiseptically treated and will strictly adhere to its true condition, doing away with the disagreeable condition of rancidity which develops with the use of common tallow.

COMBINATION. "Thistle Brand" Soluble Tallow will mix with any quantity of starch, fillers, etc. In practice we find from four (4) to eight (8) pounds per fifty (50) gallons of size give best results, depending much on the size of the yarn being worked.

LOGWOOD SOFTENER. Two per cent of "Thistle Brand" Soluble Tallow on the weight of the goods will soften the harsh, stiff effect of Logwood Black. The Soluble Tallow is applied in the finishing wash and also tends to produce a glossier black.

MINERAL OIL and "Thistle Brand" Soluble Tallow are entire strangers. We do not wish to have our customers "turning out" spotted goods and to finally discover mineral oil in the size. We are therefore afraid to take the responsibility and have kept it out of this preparation entirely.

CONSISTENCY. "Thistle Brand" Soluble Tallow is of a "creamy" consistency which permits easy handling.

PRICE. "Thistle Brand" Soluble Tallow costs less than half the price of common tallow of the best grade and yet does the same amount of work considerably better.

SAMPLES. We will gladly furnish samples for the asking, or we will send you a barrel, with the understanding if it does not do all that we claim, you may return the unused portion and full credit will be given.

David McMeekan Manufacturing Co.

(ESTABLISHED IN 1876)

1070-78 Pacific Street **Brooklyn, N. Y.**

ation it may be said on the authority of one who has probably been more closely connected with the placing of Government contracts than any other individual, in the local market at least, that less shoddy has been incorporated in fabrics delivered to the United States Government than in the supplies that were bought in this country for the use of the Allied Governments. This applies not only to uniform fabrics but to blankets. Of the latter many were sent abroad containing fully 50 per cent of shoddy.

MANY DIFFERENT BLANKETS BOUGHT

On the subject of blankets there has been decided difficulty in securing the quantities demanded. Here as well as in other divisions of the market it is probable that the secretive policy of the Quartermaster's Department has worked adversely to the prompt securing of sufficient quantities. Early in the year it was reported that very considerable quantities of blankets as well as knitted gloves were placed with Canadian manufacturers. Many of these were 4-lb. gray blankets and prominent in the orders were those emanating from the Red Cross. This allied division of the army has been a considerable factor in the purchase of supplies, its operation on blankets particularly being of sizable amounts. It was a matter of surprise in certain quarters that the Red Cross should take the number of blankets that it had, but when it was discovered that officials in this division evidently knew more about the needs of the army than certain individuals in the Quartermaster's Department, the mystery was solved. It is known that in spite of the criticism of the latter department as to the assumption of authority in making such purchases, certain very sizeable quantities were turned over in bulk to the army. A good many cotton warp blankets have been made by carpet mills who have turned over their machinery with the necessary changes to make fabrics of this kind as well as duck and these plants have proved a very valuable source of supply. On the question of profiteering an interesting incident is told in connection with the purchase of a quantity of all-wool natural color blankets for hospital nurses that were actually sold at a loss by the manufacturer who felt, however, that the necessity for such superior fabrics was so great that he would not stand on the question of price. Hospital blankets have been taken in a good many instances with cotton warp. There is a reason for this, namely, that of such construction they will stand washing and will not shrink. These were 4-lb. light colored blankets for use indoors. Dark gray shoddy blankets have been purchased for field hospitals.

NAVY OPERATIONS

Considering the publicity which has marked the operations of the Navy Department, there is not very much to say with regard to new fabrics. The cloths that have been used are fairly well known to the general public through the announcement of contracts in this as well as other publications. The purchasers of these goods has been done in accordance with the procedure that has existed for a good many years and while the amounts have not been as enormous as in the army, very sizable orders have been placed with a minimum of friction and dissatisfaction that redounds to the credit of the policy pursued.

Naturally the blue flannel is a very important requisite in the jackies' uniform. This is of two weights, namely, 7 to 8 ounces and 11 to 12 ounces. There is also an 18-ounce dark blue cloth 17½ to 18½ ounces and overcoat cloth of 30-ounce weight. There was talk at one time of a heavier fabric for overcoating fabrics somewhat similar to that used in the English Navy, but with the possible purchase of experimental quantities, very little has been done in this matter according to report, because of the more modern equipment of American vessels, at least with regard to heating facilities. Other fabrics that are taken by the Navy are gray prison flannels 10½ to 11½ ounces and a so-called fearnaught cloth made from wool shoddy 72 inches wide and not less than 32 ounces per yard. This is for use in pea jackets for winter wear. Outside of this particular fabric, it is stated that all navy requisitions call for all wool.

The sweater, wristlet, scarf, helmet and other knitted fabrics of a specialty character are not ordinarily considered as a part of the issue for the Army but they have formed a very important part in the equipment of the soldier, being supplied largely by the Red Cross or by patriotic individuals. The knitted jersey is a regular garment supplied to the Navy and as in all other Navy fabrics is of blue dye. The spiral puttee is very largely a knitted fabric and although not generally accepted as a part of the Army equipment, has been recommended by General Pershing for use in the trenches, withstanding moisture much more satisfactorily than the canvas legging.

The Marine Corps has a very complete line of Winterfield shade fabrics of different weights and this department has bought fairly large quantities of blankets containing 35 per cent. shoddy. The purchase of these goods has also been through open bids and without any material modifications. As far as the aviation corps is concerned, while the cut of uniforms is somewhat distinctive, especially in the case of overcoats, the farbics correspond rather closely to army goods. It is known that experiments are being made on suiting fabrics for convalescent soldiers but it is deemed unwise to give any particulars regarding such fabric until it is formally accepted.

The purchases by the Government of cotton duck since the war started have been many and varied. As a matter of fact, the volume of these orders has been so great and the unsatisfied demand so extensive that other than duck mills have been drafted into the production of this fabric. A number of carpet mills are thus engaged and with the continuance of the war it is possible that even a larger number may be obliged to co-operate for the supplying of the various departments.

ARMY LARGEST BUYER

Naturally the Quartermaster's Department is the largest purchasing agency for cotton duck, owing to the various uses to which this fabric is put in connection with the army service. A few new uses have developed since the war started, the principal of which are the employment of duck in connection with gas masks and its use as covering material for the auto truck, which is a new means of transportation in this war. Other uses are more or less standard, but their ramifications may not be generally known by those not intimately in touch with army requirements. Therefore, a list which is not guaranteed as absolutely complete, is given below of the various characters of duck used in the several departments of the service.

QUARTERMASTER'S DEPARTMENT

12.4 oz., 29½ in. khaki—tents.
8 oz., 28½ in. khaki—tents, tent flies and ground cloths.
33 in., 7¼ oz. O. D.—shelter tents.
6½ oz., bleached—cooks' aprons, caps, etc.
No. 4 duck, various widths—paulins.
No. 8 duck, 34 in.—cot. covers.
No. 8, 36 in.—horse blanket linings and certain paulins.
No. 6 duck, waterproofed—auto truck covers and paulins.
No. 8, 9 and 10 duck and 12 oz., various widths—gas mask covers.
28½ in.., 10 oz. O. D.—escort wagon covers.
40 in., 9 oz. army—mattress covers.
29 in., 8 oz. single filling—latrine screens (some idea of the importance of this fabric may be obtained when it is stated that over 5,000,000 yds. have been purchased).
30 in., 2.13 yd. O. D. twill—summer uniforms.
30 in., 2-yd. to 31 in. 1-yd. O. D. twill—workmen's clothing.
28½ in., 15 oz. O. D.—leggings.

ORDNANCE DEPARTMENT

No. 1 and 4 duck—gun covers, etc.
No. 8 and No. 9—hammocks.
(No. 9 is the largest quality used in this department).

NAVY DEPARTMENT

No. 2 and No. 10 sail duck—awnings, deck covers, paulins, etc.
8, 10 and 12 oz. army—tents for shore use.
No. 4, 42 in.—bags.
No. 1, 42 in.—hammocks.
No. 7, 30 in.—cots.

FIELD HOSPITAL CORPS

No. 8 and 12.4 oz. duck—litter covers.
84 in., No. 8—use not known.

MARINE CORPS

8, 10 1-3 and 12.5 oz. khaki—tents.
No. 8, 34 in.—cots.
40 in., 22 oz.—sea bags.
No. 4, 42 in., dyed khaki—bedding rolls.
40 in., 9 oz. army—mattress covers.
36 in., No. 8—paulins.

MAKING ARMY BLANKETS

Maine Woolen Plant Employed Exclusively for Government

The old woolen mill plant at East Wilton, Me., which was taken over last summer by the then newly organized East Wilton Woolen Mills, has been thoroughly renovated, new equipment installed and is now employed on a Government contract for 50,000 three-pound wool blankets; this contract is expected to be completed by the first of July.

The acceptance of this Government contract not only required new manufacturing equipment, but necessitated the construction of a dye house. The plant's present equipment consists of five sets of cards, 6 spinning jacks and 23 looms; about 60 operatives are employed.

W. W. Capers is president of the company and P. G. Hoyt is secretary and treasurer. S. G. Hall, long identified with woolen manufacture, is superintendent of the plant.

Bids for Navy

WASHINGTON, D. C., Jan. 9.—The following bids have been opened by the Bureau of Supplies and Accounts, Navy Department: On 170,000 yards of slate-color cotton drill, 28-inches, for the Mare Island Navy Yard; A. L. Gimbel at (a) $.229 per yard, (b) at $.3307; Knickerbocker Supply Co. at $.3099; Millville Manufacturing Co. at $.2448; and Universal Trading Co. at $.3093.

On 150,000 yards of slate-color cotton tape for same yard; Foster & Stewart at $.011 per yard; Knickerbocker Supply Co. at $.0113; and Universal Trading Co. at $.0138.

EXAMINER WANTED

Examination for Textile Position to Be Held February 12

WASHINGTON, D. C., Jan. 9.—An open competitive examination will be held on Feb. 12 by the United States Civil Service Commission for an examiner in textiles. The examination is to fill a vacancy in the Bureau of Engraving and Printing.

The duties of the appointee will consist of examining samples of woolen goods, particularly printers' blanketing, and cotton goods such as millinet and muslins, and deciding as to their value in the work of the Bureau. The appointee will be required to direct the washing of such textiles and to determine the best methods and the most suitable soaps and other materials to be used therein.

Competitors will not be required to report for examination at any place, but will be rated 10 per cent. for physical ability and 90 per cent. for training and experience. Applicants must show that they are familiar with the manufacture, use and laundering of both woolen and cotton fabrics and with the mechanical appliances pertaining thereto, and that they have had at least five years' experience in such work.

Export Cotton Rules

WASHINGTON, D. C., Jan. 9.—The War Trade Board has amended the ruling in regard to the exportation of raw cotton as follows: On Jan. 8 and thereafter, until further action is taken by the Board, no individual licenses shall be required for the exportation of raw cotton to the United Kingdom, France, Italy or Japan, or their colonies, possessions or protectorates, with the exception of Egyptian and Sea Island cotton, the exportation of which to any country of the world will on and after that date, Jan. 8, require an individual license. It is necessary, therefore, that shipper's declaration covering shipments of raw cotton destined to either Great Britain, France, Italy or Japan state clearly thereon the exact type of raw cotton to be shipped.

War Estimates for 1919

WASHINGTON, D. C., Jan. 8.—The secretary of the Treasury has sent supplemental estimates to Congress of appropriations for the War Department for the fiscal year 1919. Included in the estimates is $949,342,872.27 of the total amount to be appropriated for cloth, woolens, and other equipment making up camp and garrison equipment, $610,198,648.64 of which is to be appropriated for the current fiscal year ending June 30, 1918.

New Wool Stock Co.

CHELSEA, MASS.—Joseph Bakeman, Israel Glaser and J. S. Slater are the directors of the newly incorporated firm of Glaser & Bakeman, Inc., of this city, with a capital stock of $40,000, shares of a par value of $100. The company will deal in woolens and wool stocks.

Call for Navy Goods

WASHINGTON, D. C., Jan. 7.—Bids are to be opened by the Bureau of Supplies and Accounts, Navy Department, on Jan. 14 for furnishing the Pensacola, Fla., yard with 50,000 yards of 36 inch unbleached cotton cheesecloth.

Next Auction Sales

The next sale has been fixed to take place on Thursday, January 24 and Friday, January 25. Details as to quantities to be offered will be announced later.

YOU use dyestuffs—WE manufacture them!

YOU can obtain uniform quality, steady and dependable deliveries of goods, manufactured in our factories. We have not engaged in jobbing or brokering dyestuffs, for the reason that under present conditions no house can be assured of its source of supply. We, therefore, only offer those goods which we ourselves manufacture, or whose sales agency, from reliable manufacturers, we have exclusively.

You, as well as other mills, have suffered by reason of varying qualities, both shade and color, in different shipments. This has entailed no end of time, trouble and loss to the textile industry.

Realizing this, we have never permitted a shipment to leave our plant, until we had carefully standardized it—both as to color strength and shade. You can have a concrete demonstration of this fact, if you will give us part of your business.

We can sell our entire production direct to dealers and jobbers of dyestuffs. However, in order to insure the permanency of the dyestuff industry in this country, we have adopted the other policy, and make our appeal constantly to the consumer.

Our laboratories, both at the plants and in our New York office, are in charge of experienced and competent men. They are here to render every service possible to our customers and friends.

The following is a list of the colors—and we would be glad to send you product samples of every color we produce:

DIRECT COLORS:

Direct Sky Blue
Direct Blue 2B
Direct Navy Blue B
Direct Fast Yellow R (leaves silk white)
Congo Rubine and Congo Red
Direct Fast Orange R

BASIC:

Fuchsine Crystals
Fuchsine Powder
Methyl Violet
Soluble Blue
Methylene Blue
Safranine

SULPHUR:

Sulphur Khaki
Sulphur Brown
Sulphur Black

ACID COLORS:

Acid Orange O
Croceine Orange R
Acid Scarlet 3B
Acid Red A

ALIZARINE COLORS:

Alizarine Yellow R
Alizarine Green B
Alizarine Blue Black
Alizarine Brown R

DICKS, DAVID CO., Inc.

MANUFACTURERS OF DYESTUFFS AND CHEMICALS

302 BROADWAY NEW YORK, U. S. A.

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Textile World Journal

A Weekly Journal of News, Market Reports and Technical Information

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WAR SERVICE COMMITTEE

Representatives of Two Manufacturers' Associations Appointed

At a meeting held Wednesday at the office of the Woolen Goods Exchange, what is officially known as the War Service Committee of the Wool Manufacturing Industry was appointed. This succeeds the Joint Woolen Goods Committee. The personnel of this committee is as follows: Representing the National Association of Wool Manufacturers—Frederic S. Clark, president; William M. Wood, George H. Hodgson and Franklin W. Hobbs; representing the American Association of Woolen & Worsted Manufacturers—H. E. Peabody, president; George B. Sanford, Robert T. Francis and J. P. Stevens.

Frederic S. Clark was elected chairman, and Herbert E. Peabody secretary. The latter was designated to represent the committee in its relations with the U. S. Government. Winthrop L. Marvin, secretary of the National Association of Wool Manufacturers, and J. J. Nevins, secretary of the American Association of Woolen & Worsted Manufacturers, were appointed assistant secretaries of the committee.

Nathaniel Stevens and Winthrop L. Marvin were instructed to prepare a statement for publication detailing the character of fabrics which had been recommended by the late Joint Woolen Goods Committee. This statement follows:

There has been criticism of the Wool Manufacturers' Committee that has been advising the War Department because it recommended the use of a proportion of re-worked wool, popularly known as "shoddy," in army cloths. Only into two fabrics—and these the heaviest ones, the overcoating and the blankets—does any shoddy enter. There is none of this material in the uniform itself—the blouse and trousers—nor in the woolen shirting. Re-worked wool was recommended in these heavy fabrics for the purpose of conserving the country's new wool supply, where there must be a war economy for the same reason as in food or fuel.

Shoddy is not cotton or refuse, as many persons imagine. It is real wool fiber worked and used a second time. Good shoddy produced from such a source as tailors' clippings is superior to some kinds of new wool, and by the terms of the army specification only good shoddy can be used, and only in a limited proportion, in the army overcoats and blankets—the strength requirements of the blankets increased 10 pounds over the previous standard by the advice of the Manufacturers' Committee, absolutely bars out all but the best and strongest fibers, which produce a fabric just as warm as new wool itself.

Before the war there was cotton in the army overcoating, the uniform and the blankets. The Wool Manufacturers' Committee recommended that re-worked wool be substituted for this cotton in the overcoating and in the blanket to make a warmer fabric, and that the uniform be all new wool. This has been done. Before the war there was cotton in the army woolen shirting. The Manufacturers' Committee recommended that

(*Continued on page* 442)

Report of Joint Woolen Goods Committee

Relations of this Body to Council of National Defense Fully Detailed

The Joint Woolen Goods Committee which has co-operated with the Council of National Defense for many months, and which went out of existence in conformity with the regulations issued by the Government, has rendered its report to the American Association of Woolen and Worsted Manufacturers, and the National Association of Wool Manufacturers. The report follows:

Your Joint Committee of Manufacturers co-operating with the Committee on Supplies of the Council of National Defense reports a brief summary of its work which has now closed with the sending of the resignations requested by Julius Rosenwald, Chairman of the Committee of Supplies of the Council of National Defense, in the letter herein set forth.

The Joint Committee was created in pursuance of action taken at a special meeting of the Woolen Goods Exchange held on Feb. 7, 1917.

As it was then manifest that war was impending, the manufacturers present at that meeting—representing both the American Association of Woolen and Worsted Manufacturers and the National Association of Wool Manufacturers—unanimously requested Colonel John P. Wood, President of the National Association, in co-operation with Herbert E. Peabody, President of the American Association, to select a committee of seven members of which Colonel Wood himself would be Chairman, to assist the Federal Government in securing an adequate supply of woolen and worsted fabrics for the enlarged army and navy of the United States. The committee as designated was as follows:

Colonel John P. Wood of Philadelphia, Chairman.

Nathaniel Stevens, Pres. of M. T. Stevens & Sons Co., No. Andover, Mass.

Robert T. Francis, Selling Agt., of the Pontoosuc Woolen Manufacturing Co., of Pittsfield, Mass., and New York City.

Moses L. Shuttleworth, Agent of the Washington Mills of Lawrence, Mass. of the American Woolen Company.

Charles H. Wilson, of James & E. H. Wilson of Pittsfield, Mass.

George C. Hetzel, Pres. of George C. Hetzel Company of Chester, Pa.

Spaulding Bartlett, Treasurer of S. Slater & Sons, Inc. of Webster, Mass.

Colonel Wood resigned in July on the mobilization of his regiment, the First Pennsylvania Cavalry, and Nathaniel Stevens, Vice Chairman, of your Committee was elected to succeed him. There were added to the Committee:

Francis R. Masters, of Lawrence & Company of Boston and New York.

C. Brooks Stevens, Treasurer of the United States Bunting Company of Lowell, Mass.

Frederick R. Edington of the American Woolen Company of Boston.

C. Brooks Stevens and F. R. Edington were selected by the Committee on Supplies early in October for permanent duty in Washington as technical advisers to that committee. Subsequently they were elected members of our committee.

On the original appointment of the Committee due notice was given to the Council of National Defense, and the first meeting of the Committee was held in New York on March 28, 1917, with a representative of the Depot Quartermaster at Philadelphia, the principal cloth purchasing depot of the army. On March 30 the Joint Committee had its first conference in Washington with Chairman Rosenwald and Mr. Charles Eisenman, of the Committee on Supplies of the Council of National Defense, and having been previously appointed by the Council was thereupon formally recognized as one of the committees co-operating with the Council. Thereafter until the middle of September the Joint Committee held almost weekly meetings in New York or Washington.

Until Colonel Wood re-entered the Federal service he passed a considerable part of his time in consultation with the Committee on Supplies in Washington and with the purchasing agencies of the Quartermaster and Ordnance Departments of the Army and Navy and Marine Corps. Mr. Stevens, since succeeding Colonel Wood as Chairman of the Joint Committee, and members of the sub-committees have had frequent conferences with the officials in Washington.

This Joint Committee has rendered service not only to the army and navy, but also to the American Red Cross. Moreover, the Committee, through other sub-committees formed by it for the especial purpose, has taken the initiative and helped in organizing the wool manufacturing industry for wool conservation, in promoting the import of wool and in protecting the newly developed export trade in woolen goods.

RECOMMENDED FABRIC CHANGES

One of the first and most important tasks of your Joint Committee was to recommend certain changes in the specifications for army and navy fabrics, with a view:

(1) To conserving the wool supply of the nation;

(2) To make it possible for the maximum number of mills to undertake the production of these fabrics and thus to insure prompt delivery, and

(3) To maintain a just and reasonable range of prices.

It is keenly to be regretted that the representatives of the Government did not see their way clear immediately to accept last spring (1917) the earnest recommendation of the Joint Committee and also of the wool trade of the United States, that the entire available supply of wool to be taken over by the Government, in accordance with the offer of the wool trade presented through the Joint Committee. Had this recommendation been adopted it would have saved the Government many millions of dollars.

The early policy and recommendations of the committee are set forth in the following excerpt from our records:

"The Wool Manufacturers' Committee most earnestly recommends, as the real heart of the problem of securing just and reasonable prices on the military fabrics of the Government, that immediate steps be taken by the Government to control the present prices of raw wool of the ¼ blood, ⅜ blood, and ¼ blood grades required for the manufacture of military fabrics. To accomplish this it is essential for the Government to control the prices of these wools in all the primary markets of the country. The wool manufacturers are eager to furnish the Government with the requisite military fabrics at a proper price, but they cannot undertake to do this so long as their indispensable materials are advancing in the present uncontrolled market as they are from day to day. It is as necessary for the manufacturers to have their materials for Government fabrics guaranteed to them at a fair price as it is for the navy to have an assured price for its supplies of coal and oil fuel.

"What has been said above of the need of the Government control of raw wool prices applies also to the various wool substitutes authorized in the manufacture of these military fabrics.

"The Wool Manufacturers' Committee suggests that Mr. Baruch call together the Raw Wool Committee to devise some means whereby the advance of the wool market can be checked until the Government can place present desired contracts for military fabrics.

"The Manufacturers' Committee suggests further that the wool merchants agree to give prices to their customers for sufficient time to enable the mills to receive a definite answer from the Government as to whether their bids are acceptable.

"That the grade specifications for

Latest Cable News

Manchester, Eng., Jan. 10 (Special Cable to the Journal).—Distinctly dearer market; buyers resisting higher rates. Cloth demand abroad very limited; encouraging home trade sales and constant buying for war purposes. Yarns purchased sparingly. December stocktakings of spinning companies show profit of 18 per cent on share capital.

Bradford, Eng., Jan. 7 (Special Cable to the Journal).—Licenses still entirely suspended. All supplies reserved for home use. Active steps taken to obtain South American supplies. Freight likely.

wool in overcoating, uniform cloth and blankets be changed from three-eights blood to 'Low quarter blood or finer.'

"That for shirting flannels there be added to the specifications of Feb. 17, 1917, one made with a cotton warp and worsted weft, in which fabric the proportion of cotton shall not exceed 30 per cent, and that the carded woolen shirting flannel in No. 1,234 have the proportion of cotton reduced from 40 per cent to 30 per cent.

"That an additional type of olive drab uniform cloth be included, to be made of worsted (all wool) warp and worsted weft, weighing 14 oz. to the linear yard.

"That the overcoating (30 oz. melton) be made of all wool fiber, of which not to exceed 35 per cent may be of noils or re-worked wool, the minimum strength to be 65 lbs. warp way, and 50 lbs. weft way.

"That the all wool blanket specifications provide for the use of noils and re-worked wool in a proportion not exceeding 35 per cent of the whole weight.

"That an additional blanket type be adopted, to be made with cotton warp and wool weft. Such blankets to be used for saddle blankets, and made available for issue to troops as a selective alternative for the all-woolen blanket.

"That the border be omitted from the blankets.

"That the Government purchase from growers, merchants and mills at to-be-established uniform prices the requirements of wool and other raw materials required for the manufacture of its needs in woolen goods, and issue at fixed prices to the mills making goods for the Government the raw materials required therefor.

"That prices for the goods made for the Government be based upon an agreed cost of conversion and profit plus such uniform cost as is fixed by the Government for each kind of raw material required to make the respective fabrics."

The following further excerpt from our records states the position of the committee:

"Colonel Wood spoke of the committee as representing a proposition of service, not of mere manufacturing competition. The committee was working in an entirely detached way for the primary purpose of best service and best economy to the Government itself."

Minutes of all of the meetings of the Joint Committee have been duly kept and recorded, and periodical reports of all the activities of the Joint Committee, including the above, have been furnished to the Council of National Defense. For detailed information of the work of the committee these minutes and reports are permanently available. As a committee it has never made or recommended any specific purchases by the Government; it has simply recommended what it regarded as proper specifications, and has urged that these specifications should be faithfully complied with. It further recommended maximum prices on the 30-ounce olive drab overcoating and the 3 pound olive drab blanket which it regarded as reasonable and fair alike to the manufacturers and to the Government.

The members of the Joint Committee are officials of mills which have undertaken Government contracts, but these contracts have been matters of negotiation upon individual action and have not come before the committee for any consideration whatsoever. All the manufacturers of the country capable of making military or naval fabrics were urged by the committee, and practically the entire trade promised to undertake their share of service, but the activities of the committee ceased at that point and each manufacturer was left to make his own terms and arrange his own contract with the accredited officials of the Government, separate and apart from the committee.

The Joint Committee strongly recommended strict adherence to specifications securing fabric standards and at all times advised against purchases below accepted standards.

CASE OF EMERGENCY PURCHASES

For "emergency purchases" of inferior goods, the Joint Committee insisted that it should not be exposed to any charges that it in any manner acquiesced therein or was in any manner responsible therefor, and that it be entirely freed from and relieved of any accountability therefor.

In this connection we submit this extract from the minutes of the meeting of Sept. 13, 1917, in Washington:

"After a period of general discussion the Joint Committee called on Mr. Eisenman at his office in the Munsey building. Mr. Eisenman asked if it were true that the Committee were dissatisfied with the character of some of the goods purchased for army use. Acting Chairman Stevens replied that it was true—that the Committee were disturbed at some recent happenings and he instanced the purchase of certain low-priced shirting fabrics.

"Mr. Eisenman asked what the Joint Committee would do if the Secretary of War suddenly asked for 1,200,000 more yards of shirting flannel than had been anticipated—spot goods. He explained that the troops going to France had to carry with them a six months' equipment and went on to say that affairs were moving very rapidly and he would like to have the Committee designate a man or men to stay on the job permanently in Washington. The acting chairman inquired if it were true that the Committee on Supplies were getting up a 20 oz. fabric. Mr. Eisenman replied that there was not a word of truth in it, and added that he wished that goods could be manufactured as rapidly as rumors.

"Mr. Eisenman stated he kept a careful record of the emergency demands of the War Department—demands for immediate delivery. Acting Chairman Stevens said, 'If you will give us a letter to keep our own records straight we will be satisfied.' Mr. Eisenman replied, 'You can have access to our records at any time.'"

Particularly to define and emphasize the position of the Joint Committee concerning the character and quality of goods to be accepted under emergency purchases, the committee on the following day addressed the letter to Mr. Charles Eisenman of the Committee on Supplies (which is here set out):

"You may recall the request of Chairman Stevens at our conference with you yesterday when the emergency purchases were being considered, that if you would give us a letter to keep our record clear of responsibility for these hastily bought fabrics we would be quite satisfied. As we understand it you were entirely willing to state that for any defects that might develop in these emergency goods your advisory committee was not accountable.

"I am very sure that this would greatly ease the minds of the members of our committee and they feel that it is due to them.

"I am sending you enclosed the minutes of yesterday's meeting and a copy of the call issued today to the members of the executive committees of the manufacturers' associations for a preliminary conference to take up in earnest the conserving of the wool supply.

"You will also note that the committee has invited Mr. Hetzel and Mr. Wilson to act as representatives in Washington.

"With cordial regards,

"Sincerely yours,

"WINTHROP L. MARVIN,

"Acting Secretary, Joint Committee of Wool Manufacturers Co-operating with the Council of National Defense."

To this letter no reply was received.

From the time of the appointment of your committee until the early autumn (1917), we had been extremely active in advising the representatives of the Government and facilitating the production of woolen fabrics by the manufacturers of the country on a great scale for the use of the various departments of the army and navy. Although Messrs. Edington and Brooks Stevens were attached to the staff of the Committee on Supplies as technical advisers and subsequently elected to your Joint Woolens Committee, for some time prior to their appointment and since, the advice and assistance of your committee have been rarely sought.

CASE OF BASE SORTING PLANT

The circumstances regarding the existence of the Base Sorting Company and its reported methods of operation in connection with Government O. D. clippings, first came to the attention of certain members of the Joint Woolens Committee through market rumors. The Executive Committee of the American Association of Woolen and Worsted Manufacturers and such of its Directors as could attend, met to consider the situation. Nathaniel Stevens, Chairman of the Joint Woolens Committee, and Messrs. Francis, Bartlett and Wilson of the committee were asked to be present.

At this meeting, held October 17, 1917, the matter was referred to the Joint Woolens Committee for proper investigation by the following resolution:

"*Resolved*, That the entire matter (Base Sorting Company) be referred to the Joint Woolens Committee, to be brought by it to the attention of the authorities in Washington."

Our Chairman went to Washington the following day and asked the Vice Chairman of the Committee on Supplies for an appointment with our committee to discuss the general subject of the Base Sorting Company. He stated that he felt the matter was outside the domain of your committee and objected to discussing the subject with us.

In early December the individual members of your committee received the following letter:

"To obviate the present embarrassing situation in which the members of the committees appointed by me or under my direction have been placed by being called upon to act both as Government agents or advisers and also as the representatives of their respective industries, it has seemed wise to terminate the existence of your committee, and hence the tender of your resignation is requested.

"You will understand that this action is not taken in derogation of the very valuable services which you and your committee have rendered the Government in the present emergency, but is necessary to relieve your committee and the Council from a situation which has been the subject of criticism, and is also in the interest of establishing a more closely knit organization.

"I want to assure you that we are deeply appreciative of your efforts in the service of our country and of the patriotism and good judgment that have guided your services as our advisers.

"It is hoped that a committee representative of your industry will be formed by it in the near future and that in this way you will be able to continue to give us advice on the many problems which necessarily arise.

"Committee on Supplies,

"By JULIUS ROSENWALD."

"Chairman."

Promptly the members of the committee transmitted their resignations to Chairman Rosenwald. So the relation of the Joint Committee with the Government has now been completely dissolved, and the committee respectfully presents this, its final report, to the Associations responsible for its creation.

The Joint Committee, as stated, has insisted upon and regarded it as a vital and imperative obligation and duty to maintain a strict adherence to fabric standards for army and navy use to insure the comfort, and protect and guard the health of every soldier and sailor in the service of our nation.

Your committee have to state as their united conviction that the resources of the woolen manufacturers of this country were, and are, adequate to fully and properly equip the land and naval forces of our country.

(Signed) NATHANIEL STEVENS,
CHARLES H. WILSON,
MOSES L. SHUTTLEWORTH,
ROBERT T. FRANCIS,
SPAULDING BARTLETT,
GEORGE C. HETZEL,
FRANCIS R. MASTERS.

War Service Committee

(*Continued from page* 441)

this cotton content be reduced and only enough be left to prevent excessive shrinkage. This has been done also.

The American army is just as it was before the war,—the best clothed army in the world, except perhaps the German army, as it was before 1914. Every Government in the war has introduced re-worked wool into its army cloths as a necessary conserving of its wool supply, and most Governments have gone much further than our own. It is no part of the duty of the Wool Manufacturers' Committee to fix the weight or thickness of the fabrics which our soldiers wear. This is determined entirely in Washington.

PURCHASES OF TEXTILES

Secretary of War Gives Total Figures on Important Lines

Figures showing total purchases of the most important lines of textiles for the Army Quartermaster's Department, to Dec. 29, 1917, were given by Secretary of War Baker, testifying before the Senate Committee on Military Affairs Thursday:

"In the woolen goods section alone," said he, "the co-operation of over three hundred mills was involved, and the following items give some idea of the extensive character of the operations:

"More than 19,000,000 blankets, 20,000,000 yards of overcoating and more than 30,000,000 yards each of shirting flannel and suiting, involving an expenditure of more than $345,000,000. In cotton goods the Department has placed contracts for 250,000,000 yards of various goods," he continued.

As to the size of purchases of knit goods, Secretary Baker gave the following figures: winter drawers, 25,000,000 pairs; winter undershirts, 21,000,000 garments; woolen gloves, 11,000,000 pairs; wool light-weight stockings, 31,000,000 pairs; wool heavy-weight stockings, 21,000,000 pairs.

STILL "PASSING THE BUCK"

War Department and Supplies Committee Try to Shift Blame

"The week closes with the War Department and the Council of National Defense each trying to place the blame upon the other for the sorry conditions which have been revealed with respect to army uniforms," writes the Washington correspondent of the Boston Transcript. "It is difficult for the outside public to gain a fair idea of the merits of some of the disclosures without hearing all the testimony. For example, newspaper reports of the hearings state as a bald fact that the clothing of the Marine Corps is much better and warmer than that of the army. The testimony showed this to be theoretically so, but it has not developed a particle of evidence that the marine knows that he is better clothed or the soldier that he is not. Similarly with respect to the substitution of shoddy for wool, the soldier is as warmly clothed with one kind of all-wool as he is with another, except that some garments will wear a little longer than others. Fair criticism on this point has little or nothing to do with the uniform as it affects the comfort of the soldier, but is directed to the question whether the changes in the proportions of wool and shoddy have resulted in improper advantage to someone in the trade. The great question affecting the soldier himself is whether the 16-ounce cloth of which the United States uniform is composed is heavy enough—whether it should be 20-ounce, as with the British army, or 24 to 26-ounce, as with the German army. Upon this point the testimony of Michael E. Driscoll, who has made woolens for forty-five years, indicated that it would cost 50 per cent. more to give the American soldier 25 per cent. more wear, and Mr. Driscoll testified emphatically that the changes made in the American uniform detracted little if any from its warmth or wearing qualities and undoubtedly prevented a wool shortage. As Mr. Driscoll was called as a witness for the critics of Mr. Eisenman, his opinions did not suit the senators overmuch.

WILL SECRETARY BAKER WIN?

"The investigation has gone far enough already to determine that a terrific shake-up will take place in the War Department as a result of it. Secretary Baker has moved rapidly to forestall something worse and is reorganizing the bureaus of the Ordnance and Quartermaster General's Department under civilian heads. Charles Eisenman, chairman of the committee on supplies of the Council of National Defense, defended himself heroically, but undoubtedly his autocratic power in the awarding of contracts is as good as broken. Generals Sharpe and Crozier will not hereafter be recognized as the actual heads of their own departments. Reorganizations and resignations are going on every day, to the end that when the Senate inquiry is completed the War Department will be able to go to Congress and say: "We have fixed things up so this won't happen again, so please let us alone." If Congress lies down and the Chamberlain bill is killed, of course, Secretary Baker wins.

BOUGHT PRICE RATHER THAN QUALITY

"Senator Weeks, of Massachusetts, who has been a leading figure in the senatorial inquiry which has exposed the shortcomings of the War Department, in a speech on the floor of the Senate the same day pointed out that the exorbitant cost of coal to New England had not been due to prices at the mines, but to water transportation charges, which had been sent sky-rocketing by the action of the Navy Department in commandeering tonnage used in the New England coal-carrying trade. It is charged against the Council of National Defense in the clothing inquiry that it bought price rather than quality. The charge may be applied with double force to Secretary Baker with relation to coal."

EQUIPMENT SHORTAGE

Responsibility Placed on Various Shoulders by Those Testifying

WASHINGTON, D. C., Jan. 7.—Who, if anyone, is to blame for the cloth and clothing and blanket shortage in the army and is there a shortage? That is the question that is being asked daily by the Senate Committee on Military Affairs in investigation of the purchasing in the army. Several men have been heard by the committee, several experts, and yet almost everyone has a different story to tell and each one is blaming the other fellow for not doing his duty properly. Members of the Senate Committee say that they are going to get at the bottom of the thing if it takes them a lifetime. Charles Eisenman in his testimony has blamed the Quartermaster's Office for not having goods made up as fast as they were furnished to them and the Quartermaster's Department is blaming the Committee on Supplies for not getting the cloth to them on time. Officers in charge of cantonments are saying there is a shortage of clothing and Secretary of War Baker is issuing statements that there is no shortage. Altogether the whole thing seems, at this moment, to be very much muddled.

To go back. There are certain members of the Senate Committee on Military Affairs who have started out with the idea of placing the entire blame on the Committee on Supplies, of the Council of National Defense, and especially on Mr. Eisenman. Your correspondent is given to understand on the very highest authority, and from a source having nothing to do with the Council of National Defense, that some of the Senators have an "ax to grind." One man, especially, who has shown the greatest antagonism is alleged to have been turned down with one of his "big" constituents who tried to "put over" something on the Committee on Supplies, but who was unable to do it. Undoubtedly the committee has created many enemies, as indeed it must, because there are always those who must be dissatisfied. On the other hand, as has been repeatedly pointed out in this paper, the secrecy which has been maintained by the office of the Quartermaster General of the Army, at the instance of Mr. Eisenman, has been a mistake from the word go. Things would have been quite different at this time if a reasonable amount of unharmful publicity had been given to the vast purchases that were being made. Senators who have been making this investigation are agreed with that sentiment.

Failure of the Government to call on many large clothing manufacturers to make uniforms was assailed before the Senate committee last week by Frank S. Turnbull, of New York, president of Rogers, Peet & Co.

"There was no earthly reason why we could not have clothed the men, and clothed them fast," he said, citing the fact that virtually none of the large plants at Rochester, N. Y. had been used by the Government. He thought too much shoddy was being used under the new cloth specifications.

To conserve wool, Mr. Turnbull said Charles Eisenman had proposed that shoddy be used in all civilian clothing during the war. "That was visionary and impractical," Mr. Turnbull said, "and could only be done by law. Mr. Eisenman wanted to start a propaganda to stop wearing all-wool garments by civilians."

Julius Forstmann, of Passaic, N. J., told the committee that he did not believe that a limited percentage of shoddy would deteriorate the quality of Army overcoats, but he opposed its use in other clothing. No shoddy was used before the war, he said, in the German uniforms.

In their further investigations of contracts negotiated by the Committee on Supplies the Senate Military Committee has been furnished with a statement by Mr. Eisenman of merchandise bought from firms whose members or employes are or were connected with the committee.

Of supplies worth about $800,000,000 bought during the past eight months, the statement shows that $128,830,000 worth came from such concerns but of this amount all except $14,830,064 worth was contracted for before the contractors' representatives became connected with the committee.

In presenting the statement to the committee Mr. Eisenmann defended the committee's work, upheld the secrecy in advance of letting contracts and insisted that the men given the much-discussed scrap-sorting contract would have been limited to a nominal profit.

During one of his appearances before the committee last week, Mr. Eisenman and Senator McKellar very nearly came to blows. Mr. Eisenman vigorously resented what he termed questions impugning his motives and insulting him.

Col. Elmer Lindsley, inspection and purchasing head of the Quartermaster's Depot at Philadelphia, criticized the quality of army clothing made under the new specifications of the supplies committee providing for the use of shoddy. He stated that standards were lowered and garments and blankets of less durability and warmth were being produced.

Senator McKellar, of Tennessee, who has "had it in" for the Council of National Defense, and particularly for the Committee on Supplies, has introduced a bill amending the act creating the Council. The most important feature of the bill, which has been referred to the Committee on Military Affairs, of which he is a member, refers to the serving on committees by those interested and reads as follows:

"That it is hereby declared to be unlawful for any person to be employed in any of the executive departments or by any of the various boards or committees of the Government at a nominal salary, or to give their services free. Every person employed by the Government shall be employed at a fixed salary, which salary shall be reasonable for the services performed. The system of advisory committees and boards, where the members thereof purport to serve the Government without compensation, or for a nominal compensation, now in vogue in some of the departments, is hereby probihited.

"That any person violating this Act shall be fined not less than $1,000 nor more than $5,000 and be imprisoned not less than one year nor more than five years."

WASHINGTON, D. C., Jan. 8.—The Senate Committee on Military Affairs to-day was again confronted with conflicting evidence. Winthrop L. Marvin, of Boston, secretary of the National Association of Wool Manufacturers, told the committe that the wool supply would tide over the present emergency if strict economy was practiced. He urged that if substitutes have to be used that they be used in the clothes for civilians and not for the soldiers "over there."

During the course of his testimony before the committee Mr. Marvin said that shoddy does not materially decrease warmth, but it does decrease the strength of the cloth. "For all practical purposes," said Mr. Marvin, "clothes made with shoddy are as warm as all-wool." He testified further that shoddy is warmer than cotton.

Mr. Marvin told the committee that the wool supply of the world is now about 3,000,000,000 pounds annually, that the supply is decreasing while its use is increasing to a considerable extent. He stated that England is assured of a plentiful supply from Australia, but that the clip last year in the United States, according to the latest figures of the Departmetn of Agriculture, decreased from 288,000,000 pounds in 1916 to 285,000,000 pounds in 1917. Mr. Marvin told the committee that there had been very little trouble between members of his association and the committee on supplies of the Council of National Defense. He strongly contradicted statements which have been made by other witnesses to the committee that the use of shoddy was greatly depreciating the value of the Army cloth and making it less warm for the soldiers.

Col. John P. Wood, of the service, former president of the National Association of Wool Manufacturers, in his testimony vigorously defended the use of reworked wool instead of cotton in Army uniforms. He opposed proposals that the army uniform be made heavier. He insisted that it would be a great mistake to impose heavier clothing upon the soldiers while training in this country and that it would be time enough to make the change if actual experience abroad demonstrated its necessity.

Again defending the work of the Committee on Supplies of the Council of National Defense and stating that the committee has saved the Government some $75,000,000, the testimony of Charles Eisenman before the Senate Committee on Military Affairs came to an end Tuesday. The committee is about finished with the clothing end of their investigation unless the members find it necessary to again call upon some of the witnesses.

During the course of his closing testimony Mr. Eisenman upheld the work of the committee of which he is vice-chairman and criticized severely the work of the office of the Quartermaster General of the Army because of the red tape involved in its work.

Another witness yesterday was Nathaniel Stevens, of the National Association of Wool Manufacturers, who told the committee that the use of shoddy in army garments has not made them inferior in quality nor less warm. On Wednesday A. L. Scott and David Kirschbaum, of Philadelphia, were heard. Rear Admiral McGowan, head of the Bureau of Supplies and Accounts, Navy Department, was heard as to his methods of purchasing, and Secretary of War Baker is also to appear before the committee.

WASHINGTON, D. C., Jan 10 (*Special*).—Secretary of War Baker began his testimony this morning before the Senate Committee on military affairs. After making a rather extensive statement during which he said that while the clothing supply of the army had been inadequate at first, it is now sufficient, he was questioned on matters in connection with the Ordnance Department. It is expected it will be several days before he will take up the work of the Quartermaster General's office.

THE PERSONAL PAGE

Col. John P. Wood, who was lately transferred from the First Pennsylvania Cavalry to a regiment of engineers, has again been transferred and is now stationed in Washington in connection with the Quartermaster's Department. It is understood that Colonel Wood will be associated under General Goethals, the new Quartermaster General and with Colonel Hirsch and Captain Schofield in the purchase of textiles. His exact title has not been stated at this writing.

Edwin A. Fleisher, treasurer of S. B. & B. W. Fleisher, Inc., worsted and woolen yarn spinners, Philadelphia, is to address the Jobbers' Association of Notion Buyers at their convention in the Waldorf-Astoria Hotel, New York, next Wednesday. He will speak on "War Emergency Knitting Yarn Conditions."

Franklin W. Hobbs, Boston, president of the Arlington Mills, will speak on "Commercial Preparedness for International Peace" at the annual meeting of the National Wholesale Dry Goods Association in the Waldorf-Astoria, this city, on Monday.

Henry B. Endicott and James J. Phelan, who spoke in Lawrence last week at the Manufacturers' Conference, later visited the Wood Worsted Mills, where they were the guests of Agent Walter M. Lamont.

Frank E. Harding has been re-elected chairman of the Board of Trustees of the Lawrence (Mass.) Industrial School.

The engagement is announced of Miss Irene Wood, daughter of William M. Wood, president of the American Woolen Co., to Captain Bernard Lucas Sutcliffe of Halifax, England, of the Northumberland Fusiliers. Mr. Sutcliffe is the son of Thomas Sutcliffe, of Sutcliffe & Co., wool dealers, of Halifax, and the brother of F. L. Sutcliffe of Boston, the representative in this country of Sutcliffe & Co.

Nathaniel Stevens, president of M. T. Stevens & Sons Co., North Andover, Mass., was elected to the board of directors of the First National Bank, Boston, on Monday. Frank J. Hale, of the Saco-Lowell Shops, and Robert Amory, of Amory, Browne & Co., were also elected to the board.

P. C. Withers, president and manager of the Illinois Knit Goods Co., Mt. Vernon, Ill., is to address the annual meeting of the Jobbers' Association of Knit Goods Buyers, Monday, at the Waldorf-Astoria, this city. The subject of his address will be "Helping America in Knit Goods."

James R. MacColl, president of the Lorraine Manufacturing Co., Pawtucket, R. I., will speak on the "Wool Situation" at the annual meeting of the Jobbers' Association of Dress Fabric Buyers at the Waldorf-Astoria, New York, next Tuesday.

William B. M. Chace, one of the large owners of corporate stocks in Fall River, was treasurer of a committee on raising a fund for Halifax. This committee collected $5,000.

Ben. C. Chace, Jr., manager of the Crown Manufacturing Co., Pawtucket, R. I., was in Philadelphia this week visiting his friends in that section. He made his headquarters at the office of Richard A. Blythe, Inc., their representatives.

F. L. Sutcliffe, of Sutcliffe & Co., wool importers, Boston, has nearly completed a course at the officers' training school in Toronto, Ont. His brother Bernard is a captain of the Northumberland Fusiliers.

Philip L. Reed, of Winslow & Co., wool merchants, Boston, has been giving the greater part of his time during the last three months to the purchasing of knitting yarns for the Red Cross. H. E. Mabbett, treasurer of George Mabbett & Sons Co., worsted manufacturers, Plymouth, Mass., has been giving a part of his time to the same work. They have been given valuable assistance by Andrew Adie, president of the U. S. Worsted Co., particularly in the standardization of such yarns.

Russell G. Rankin, of New York City, has been appointed chief accountant for the U. S. Tariff Commission in their investigation of the chemical industry.

W. L. Crandall, southwestern sales representative of Clift & Goodrich, knit goods, New York, has resigned to become associated with Stone & Warren, commission merchants, of the same city.

M. B. Whitehead, who was in charge of the export department and the New York office of the Everwear Hosiery Co., Milwaukee, Wis., has accepted a position with the Cooper Underwear Co., Kenosha, Wis., as their Boston and New England representative.

J. Lloyd Coates, of Coates Bros., wool dealers, Philadelphia, has been the recipient of numerous congratulations on the birth of a son, Benjamin Coates.

Stuart W. Cramer, Charlotte, N. C., the well-known southern cotton manufacturer and machinery dealer, returned to Washington on Monday of this week to resume his duties in connection with the enforcement of the new revenue law.

William F. Jackson, assistant purchasing agent, J. & J. Dobson, Inc., Philadelphia, has severed his connection with that company to accept a position with the American International Shipbuilding Corporation. Mr. Jackson had a large circle of friends in the textile trade who, while regretting his severance from the industry, wish him success in his new connection.

Eugene B. Alderman succeeds Willard W. Stearns as general superintendent of the Farr Alpaca Co., Holyoke, Mass. He had been superintendent of the No. 1 factory.

H. P. Hansen, of Brantford, Ont., has accepted the position of superintendent of the British-American Dyeing Co., Montreal, Que.

S. B. Gabriel, general manager of the National Crash Co., Millbury, Mass., for about 14 years, has resigned.

Anthony J. Dixon, superintendent of the National Crash Co., Millbury, Mass., has been promoted to the agency of the plant, succeeding S. B. Gabriel, resigned. Mr. Dixon has been with the company for about 14 years, during the first 12 as overseer of weaving, and the last two years as superintendent.

Thomas Hope, superintendent of the Pawcatuck Woolen Mills, Westerly, R. I., has been confined to his home by an attack of the grippe.

Charles W. Collins, who retired the first of the year as superintendent of the Fall River (Mass.) Bobbin & Shuttle Co., a position he has held for the past 25 years, was presented with a gold watch chain and Masonic charm by the employes of the plant. George Hutchinson, assistant superintendent, who has been appointed to succeed Mr. Collins, made the presentation.

Charles Kirkpatrick, superintendent of West Point (Ga.) Utilization Co., has been in Boston this week on a business trip and attended the banquet of the American Cotton Waste Exchange.

Thomas C. Moriarty, whose resignation as an overseer in the Royal Mill, Riverpoint, R. I., was previously noted in these columns, was presented with a roll-top desk and chair last Saturday by the employes of his department. His successor, Patrick Walsh, made the presentation.

Joseph Bouchard, an overseer for the last 14 years at the River Spinning Co., Woonsocket, R. I., has resigned to accept a position with the Strathmore Worsted Co., Concord Junction, Mass.

Frank Pieracoln has resigned as overseer of weaving at the Barnard Manufacturing Co., Fall River, Mass., to become an inspector of the fabrics for the Goodyear Tire & Rubber Co., Akron, O.

Walter S. Oliver, assistant chief machinist of the Arlington Mills, Lawrence, Mass., died at his home in Methuen last week at the age of 32 years.

OBITUARY

J. Howard Krewson

J. Howard Krewson, who several years ago was connected with the Cheltenham Knitting Co., Germantown, Philadelphia, died on Jan. 6 at Saranac Lake, N. Y., after long illness. Mr. Krewson was forty-five years of age. He was also former Commissioner of Cheltenham Township, Pa. He is survived by his widow and five children.

George Dexter Burton

George Dexter Burton, president of the Burton Company, textile fibers and yarns, Clinton, Mass., a noted inventor of degumming and dehairing processes, died suddenly at his home in Boston, Mass., Jan. 6, following an operation. He was born at Temple, N. H., sixty-two years ago. He is survived by his widow. The interment was at New Ipswich, N. H., last Wednesday.

Ephraim Stearns

Ephraim Stearns, of Blake & Stearns, woolen importers, Boston, died January 5, at his residence in Waltham, Mass., at the age of 79. He was a native of that city, was educated in its public schools and commenced business life in 1856 with the old woolen goods firm of Milton Cushman & Co. He was a veteran of the Civil War, being mustered out with the rank of sergeant. He received his title of colonel as a member of the staff of former-Governor Robinson of Massachusetts. He had been prominent in local politics and was a delegate to the Republican National Convention in 1884.

James W. C. Pickering

James W. C. Pickering, for many years a prominent textile manufacturer, died at his home, 10 Ash street, Lowell, Mass., December 31, following a long illness. He was founder and for many years head of the Pickering Knitting Company, hosiery manufacturers, until his retirement from active business a few years ago. He was a native of Lowell where he was born September 1, 1844. In early life he engaged in the clothing business but in 1884 he established the company which bore his name. He was vice-president of the Appleton National Bank, director of the Erie Telephone Co., trustee of the Mechanics Savings Bank and was interested in many fraternal organizations, including the Masons, Odd Fellows and Y. M. C. A. He is survived by two sons, Herbert D. of Lowell and Edward of Millbury, Mass., and two daughters, Mrs. F. B. Harbottle of Indianapolis and Mrs. William T. Trull of Lowell, and two sisters.

W. Howard Chase

W. Howard Chase, treasurer and agent of the Leominster (Mass.) Worsted Co., died last week after a brief illness. Mr. Chase was born in North Weare, N. H., in 1857. After completing his education he started in the insurance business, but a few years later, in 1880, he became overseer of weaving at the old Smith & Converse woolen mill in his native town. Two years later he went to Leominster, Mass., in a similar position with the former E. M. Rockwell mill. He continued in this position until with William Rodgers he founded the Leominster Worsted Co., of which he was treasurer until the time of his death. While active in the public welfare of Leominster for many years, Mr. Chase could never be prevailed upon to seek an elective office, but for 25 years was a member of the Leominster Water Board, resigning from the latter in 1916. He was a director of several banks, a member of several prominent clubs in the vicinity of Leominster, and stood high in Masonic membership. He is survived by a daughter and son.

H. Hodgson

The death of H. Hodgson, founder of the Queensbury Mills of Worcester, Mass., occurred Monday morning after a lingering illness of five years. Mr. Hodgson was born in Halifax, England, seventy-one years ago, coming to this country thirty-six years ago and locating in Philadelphia. While there he was in the employ of John and James Dobson of that city, and inaugurated for that concern the manufacture of mohair yarn. From Philadelphia he went to Sanford, Me., and was associated with the Goodall Worsted Co. until 1890, when he moved to Worcester and established the Queensbury Mills, for the purpose of manufacturing mohair and lustre yarn. The business established in a small way, has grown to considerable size, and now employs between six and seven hundred hands, with a branch mill at Somersworth, N. H. Mr. Hodgson held the office of president and treasurer until five years ago when, through ill health, he was compelled to retire. He was untiring and aggressive, and by those who knew him intimately, was held in the highest esteem. Mr. Hodgson was of a home-loving disposition and aside from his affiliation with the Masonic fraternity, of which he was a thirty-second degree Mason, belonged to no clubs or societies. Besides his widow Mr. Hodgson leaves one son and four daughters and five grandchildren. The funeral, which was private, was from the home, 906 Main street, Worcester, Thursday morning.

FINANCIAL MARKETS

FALL RIVER MILL STOCKS

Dividend Declarations Since December Distributed

FALL RIVER, MASS., Jan. 10.—Within ten days, nine of the textile corporations of this city have distributed the dividends which they have declared since the middle of December. The cash disbursement amounted to $253,650, divided as follows: Cornell Mills, $40,000, 10 per cent.; Flint Mills, $46,400, 4 per cent.; Davol Mills, $7,500, 1½ per cent.; Pilgrim Mills, $3,750, on the preferred issue, $250,000, 1½ per cent., and $24,500, 3½ per cent., on the common stock; Chace Mills, $36,000, 3 per cent.; Osborn Mills, $22,500, 3 per cent.; Tecumseh Mills, $22,500, 3 per cent.; Richard Borden Manufacturing Co., $30,000, 3 per cent.; King Philip Mills, $45,000, 3 per cent.

If the proportion should be maintained until the close of the quarter, the total amount of cash received by stockholders would be $1,127,320. As compared with the first and last quarters of last year, the approximation would be $382,845 greater than the sum owners of stock were privileged to receive when 1917 opened, and only $89,814 less than the final distribution for the twelvemonth.

Sanguine people are to be found who do not hesitate to predict that the quarter will be even closer to the last. Their belief is based on the fact that, in spite of the increase in overhead expenses due to the advance of 12½ per cent. in operatives' wages, manufacturing profits continue to be large. Cloth market conditions are such that even a moderately active demand should bring about a further ascension in quotations on account of the sold-up state of print cloths, with seekers of fine goods makes finding themselves obliged to meet producers' terms in trying to insure quick delivery, or contracts extending well into the spring.

It is rather doubtful if the record for size will be challenged successfully, or closely, unless some of the corporations carrying weighty surpluses conclude to surpass their rates for the quarter marking the close of the fiscal year. The improbability of such a decision might be gauged by the action of the King Philip directorate. That body can display quick assets amounting to the fine pyramid of a million and over, and yet the dividend is 2 per cent. less than the last, when 5 per cent. was paid. The Osborn Board made the same reduction; likewise the Tecumseh. Diminished returns were made by other mills. After starting the new year 12 months ago with a rate of 2 per cent., the Flint declared three successive sixes afterward. The Chace also opened with a small rate; the second and third quarters it advanced to 4 per cent., and the last three months' showing was on the 5 per cent. basis.

There has been some disappointment because the Davol has become conservative, but it would seem to be the sensible purpose of the management to provide against probable needs in times of dullness. The stock has not gone beyond $200, and the promise of doing something in the way of provision is better on the threshold of the year than it is possible to determine at this point what it might be six months hence, though there are few companies which are not assured of lucrative contracts for all that their machinery can produce meanwhile.

DIVIDEND GENEROSITY

Whether there is to be as much generosity in a dividend way as in the recent past continues to be treated inconsequentially by investors, who watch philosophically the gradual decline in a few quotations for reasons beyond the understanding of the average reasoner. Wampanoag's drop to 86 indicates a loss of four points from the holder's estimate of values; and the sale of Border City at 96 is a concession of 2½ points to the buyer.

The New Bedford situation is decidedly bearish. Whitman was held at 148 early in November, and bid for at 144; to-day the figures are respectively 145 and 140. Sharp common was sought for at 81, against a recent sale at 78. Taber is in the market at 115 instead of 121½ two months back. Quissett common is one of the few securities which have appreciated going from 145 to 150; but the preferred is shown to 98, a loss of seven points.

THE BOSTON AUCTIONS

The sales of textile shares at to-day's Boston auctions were as follows:

Shrs.	Mill.	Par.	Sale.	Chge.
1	Lyman	100	131⅛	— 1⅝
2	Lowell Bleachery	100	125	—13
1	Hamilton Mfg.	100	90	— 8
12	Mass. Cotton	100	134	+ 8
2	Plymouth Cord'e.	100	185	+ 3
8	Union Cotton	100	203	+ 2
20	West Point	100	200⅛	—

46 Total.

SOUTH CAROLINA MILLS

Largely Increase Output Duirng 1917 on $8,000,000 More Capital

RALEIGH, Jan. 9 (*Special*).—Official figures received here by a mill man concerning the textile business in South Carolina for the year 1917, disclose the following:

That there was a net increase for the year (over 1916) of $46,439,216 in annual output. That the total amount of capital invested in 1917 was $7,759,225 more than in 1916.

The number of textile establishments in South Carolina were the same in 1916 and 1917, but three less than in 1915. There was a decrease of 3,170 partners or stockholders reported. The number was 16,642 in 1917, 19,818 in 1916 and 13,185 in 1915.

The invested capital for the three years was $92,531,304 in 1917, compared with $83,772,079 in 1916 and $87,123,899 in 1915, and the value of the annual product in 1917 was $155,901,909 and in 1916 and 1915, respectively, was $109,462,693 and $75,675,197.

Textile Share Quotations

		Sales.	
Am. Woolen pf	$100	90¼	89
Amoskeag	100	60⅛	60⅝
Amoskeag pf.	100	80	82
Androscoggin	100	190	190
Appleton	100	196	200
Arlington	100	106⅝	107
Bates	100	253½	275
Bigelow-Hartford pf.	100	80⅛	85
Chicopee	100	†97	100
Continental	100	83	70
Dwight	500	1105	1125
Edwards	100	61	59
Esmond pf.	100	86	96¼
Everett	100	125¼	123
Franklin	100	210	210
Great Falls	100	194	195⅛
Hamilton Woolen	100	86	90
Hamilton Cotton	100	90	98
Hill	100	77	77
Lancaster	100	77	77
Lawrence	100	131	*131⅛
Lockwood	100	102⅛	110
Ludlow Associates	100	116	119
Lyman	100	131⅛	133
Massachusetts	100	134	126
Mass. Mills in Ga.	100	96¾	99
Merrimack pf	100	75¼	*77
Merrimack com.	100	*62	63⅛
Middlesex	100	57	56
Nashua	500	816	798
Naumkeag	100	173	195½
N. E. Cot. Yn. com.	100	88	88
Newmarket	100	105	151⅛
Pacific	100	130	129
Pepperell	100	195	200
Plymouth Cordage	100	185	182
Salmon Falls M. Co.	100	70	66
Tremont and Suffolk	100	137½	139
Waltham B. and D.	100	132¼	115
York Mfg. Co.	100	*113	118

* Ex-dividend.

New Bedford Quotations

(By Sanford & Kelley, New Bedford, Mass.)

	Bid.	Asked
Acushnet Mills	125	..
Beacon Mfg. Co. com.	105	..
Beacon Mfg. Co. pf.	100	..
Booth Mfg. Co. com.	60	..
Booth Mfg. Co. pf.	..	107½
Bristol Mfg. Co. com.	..	91
Butler Mfg. Co. com.	89	92
Butler Mfg. Co. pf.	*96	..
City Mfg. Co.	124	..
Dartmouth Mfg. Co. com.	210	215
Dartmouth Mfg. Co. pf.	90	94
Fairhaven Mills com.	..	90
Fairhaven Mills pf.	..	90
Gosnold Mills com.	..	105
Gosnold Mills pf.	..	90
Grinnell Mfg. Co.	130	..
Hathaway Mfg. Co.	120	..
Holmes Mfg. Co. com.	..	*240
Holmes Mfg. Co. pf.	120	..
Kilburn Mills	120	130
Manomet Mills	125	..
Nashawena Mills	98	100
N. B. Cotton Mills com.	100	..
N. B. Cotton Mills pf.	85	88
Neild Mfg. Co.	..	155
Nemasket Mills, com.	90	..
Nemasket Mills, pfd.	95	..
Nonquitt Spinning Co.	108	..
Page Mfg. Co.	79	83
Pierce Mfg. Co.	..	375
Pierce Bros., Ltd.	105	..
Potomska Mills	130	..
Quissett Mills com.	152½	..
Quissett Mills pf.	98	..
Sharp Mfg. Co. com.	..	76
Sharp Mfg. Co. pf.	98	..
Soule Mill	88	92
Taber Mills	113	115
Wamsutta Mills	108½	..
Whitman Mills	140	145

* Ex-dividend.

Southern Mill Stocks

Quotations furnished by A. M. Law & Company, Spartanburg, S. C.

	Bid.	Asked
Abbeville Cotton Mills, S. C.	120	125
American Spinning Co., S. C.	160	—
Anderson Cotton Mills, S. C. Com.	39	41
Anderson Cotton Mills, Pfd.	80	85
Aragon Mills, S. C.	105	130
Arcadia Mills, S. C.	120	—
Arkwright Mills, S. C.	165	180
Augusta Factory, Ga.	—	38
Avondale Mills, Ala.	140	150
Beaumont Mfg. Co., S. C.	175	200
Belton Cotton Mills, S. C.	120	130
Brandon Mills, S. C.	93	95
Brogon Mills, S. C.	73	76
Calhoun Mills, S. C., com.	102	105
Calhoun Mills, S. C., pfd.	101	—
Chesnee Mills, S. C.	132	135
Chiquola Mills, S. C.	134	145
Clifton Mfg. Co., S. C.	110	115
Clinton Cotton Mills, S. C.	120	—
Courtenay Mfg. Co., S. C.	115	120
Columbus Mfg. Co., Ga.	108	—
D. E. Converse Co., S. C.	100	105
Decatah Cotton Mills	160	—
Dallas Mfg. Co., Ala.	116	—
Darlington Mfg. Co., S. C.	—	78
Drayton Mills, S. C.	30	—
Dunean Mills, S. C.	55	58
Eagle & Phenix Mills, Ga.	102	—
Easley Cotton Mills, S. C.	250	—
Enterprise Mfg. Co., Ga.	—	63
Exposition Cotton Mills, Ga.	175	—
Gaffney Mfg. Co., S. C.	—	92
Gainesville Cotton Mills, Ga. Com.	80	90
Glenwood Mills, S. C.	102	—
Glenn-Lowry Mfg., Co., S. C. Pfd.	—	75
Gluck Mills, S. C.	95	101
Graniteville Mfg. Co., S. C.	75	—
Greenwood Cotton Mills, S. C.	130	145
Grendel Mills, S. C.	180	185
Hamrick Mills, S. C.	135	—
Hartsville Cotton Mills, S. C.	200	—
Henrietta Mills, N. C.	185	—
Inman Mills, S. C.	120	—
Inman Mills, S. C., Pfd.	93	101½
Jackson Mills, S. C.	160	—
Judson Mills, S. C.	118	125
King, John P. Mfg. Co., Ga.	—	95
Lancaster Cotton Mills, S. C.	150	—
Laurens Cotton Mills, S. C.	125	—
Limestone Cotton Mills, S. C.	145	—
Loray Mills, N. C.	25	—
Lorny Mills, N. C., 1st Pfd.	102	103
Marion Mfg. Co., N. C.	125	—
Marlboro Mills, S. C.	130	150
Mills Mfg. Co., S. C.	140	—
Mollohon Mfg. Co., S. C.	110	—
Monarch Cotton Mills, S. C.	95	101
Newberry Cotton Mills, S. C.	175	—
Ninety-six Mills, S. C.	—	—
Norris Cotton Mills, S. C.	112	—
Oconee Mills, Com.	94	—
Oconee Mills, Pfd.	93	—
Orr Cotton Mills, S. C.	107	113
Pacolet Mfg. Co., S. C.	120	126
Pacolet Mfg. Co., S. C., Pfd.	100	—
Panola Mfg. Co., S. C.	60	—
Pelzer Mfg. Co., S. C.	130	140
Pickens Cotton Mills, S. C.	130	—
Piedmont Mfg. Co., S. C.	175	185
Poe, F. W., Mfg. Co., S. C.	130	—
Riverside Mills, S. C., Pfd.	110	—
Saxon Mills, S. C.	135	—
Sibley Mfg. Co., Ga.	—	60
Spartan Mills, S. C.	160	175
Toxaway Mills, S. C., Pfd.	80	—
Tucapau Mills, S. C.	300	—
Union-Buffalo Mills, S. C., 1st Pfd.	90	94
Union-Buffalo Mills, S. C., 2nd Pfd.	15	18
Victor-Monaghan Mills 1st Pfd.	93	96
Victor-Monaghan Co., Com.	60	62
Victor-Monaghan Co., Pfd.	90	92½
Ware Shoals Mfg. Co., S. C.	105	—
Warren Mfg. Co., S. C.	60	—
Watts Mills, S. C.	10	—
Whitney Mfg. Co., S. C.	120	—
Williamston Mills, S. C.	115	—
Woodruff Cotton Mills, S. C.	120	126
Woodside Cotton Mills, S. C., Com.	71	—
Woodside Cotton Mills, S. C., Pfd.	—	78
Woodside Cotton Mills, S. C., Guaranteed	82	—
W. S. Gray Cotton Mills	155	—

Inactive Textile Stocks

Reported by Philip M. Tucker, 201 Devonshire St., Boston

	Bid.	Asked
Amoskeag Com.	60	63
Amoskeag Pfd.	75½	77
Arlington Mills	107½	116
Bates	..	270
Boott Mills	..	..
Border City	..	98
Brookside Mills	150	..
Charlton Mills	116	..
Columbus Mfg. Co.	127	..
Dartmouth Mfg. Com.	205	216
Dwight	1050	..
Everett	118	..
Farr Alpaca	155	..
Flint Mills	..	156
Hamilton Mfg. Co.	..	92½
Hamilton Woolen	..	95
King Philip Mills	..	160
Lancaster Mills	..	85
Lanett Cotton Mills	165	..
Lawrence Mfg. Co.	..	115
Lincoln	..	96
Lyman Mills	130	..
Manomet Mills	124	..
Mass. Cotton Mills	132½	..
Mass. Mills in Ga.	..	92
Merrimack Com.	55	..
Nashawena	98	100½
Nashua Mfg. Co.	750	..
Naumkeag	162½	..
Nonquitt	110	115
Pacific	129	..
Pepperell	..	187½
Sagamore Mfg. Co.	240	260
Salmon Falls Com.	60	..
Sharp Mfg. Com.	77½	80
Sharp Mfg. Pfd.	100	104
Tremont & Suffolk	..	135
Union Cotton Mfg. Co.	200	..
Wamsutta Mills	108½	..
West Point Mfg. Co.	195	..

Fall River Quotations

(By G. M. Haffards & Co., Fall River, Mass.)

Cotton stock.	Par Value.	Bid.	Ask.	Sale
American Linen Co.	$100	..	87½	..
Arkwright Mills	100	110	..	..
Barnard Mfg. Co.	100	75	..	..
Bourne Mills	100	..	115	..
Border City Mfg. Co.	100	..	98½	96
Chace Mills	100	..	125	..
Charlton Mills	100	..	122½	..
Davis Mills	100	..	108	..
Davol Mills	100	..	105	..
Flint Mills	100	..	150	150
Granite Mills	100	..	100	..
Hargraves Mills	100	..	70	..
King Philip Mills	100	..	162½	..
Laurel Lake Mills	100	90	95	..
Merchants Mfg. Co.	100	..	108	..
Mechanics Mills	100	..	102½	100
Narragansett Mills	100	100	107½	105
Parker Mills Com.	100	..	70	..
Pilgrim Mills Com.	100	..	100	..
Pilgrim Mills Pfd.	100	..	100	..
Pocasset Mfg. Co.	100	..	95	..
Richard Borden Mfg. Co.	100	..	155	..
Sagamore Mfg. Co.	100	..	..	..
Seaconnet Mills	100	..	67½	..
Shove Mills	100	80	85	..
Stafford Mills	100	..	106	..
Stevens Mfg. Co.	100	..	112	..
Tecumseh Mills	100	..	135	..
Union Cotton Mfg. Co.	100	..	..	..
Wampanoag Mills	100	85	90	88
Westamoe Mills	100	..	102	..

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MILL NEWS

Cotton

CHARLOTTE, N. C. The Belk Bros. Mills, Inc., have been granted a charter to manufacture cotton and other textile fabrics. The new concern is capitalized at $1,254,000, the incorporators being W. H. Belk, B. N. Graves, George H. Brockenbrough, Sr., and George H. Brockenbrough, Jr. A building has been purchased in the Dilworth suburb of Charlotte which will be enlarged. Operations will be started with 150 looms but carding and spinning machinery will probably be added in the near future.

*FOREST CITY, N. C. J. L. & E. M. Crow, who will establish a new cotton mill at Forest City, Rutherford county, N. C., state that they have an available building now ready and will at once equip it with about 450 ring spindles and will operate on 12s to 20s yarns at first. Waterpower drive will be used to operate the machinery.

LAWRENCE, MASS. The contract for the erection of the 250 x 90 ft. two-story building which is to be added to the Katama Mill has been awarded to L. E. Locke, of Lawrence. The company plans to instal 125 Crompton & Knowles automatic lire duck looms. This will increase their production 70,000 pounds weekly. It is expected that the building will be ready in about three months.

*LOWELL, MASS. The new weave shed which has been under construction for the Tremont & Suffolk mills, has not as yet been completed owing to the fact that some of the steel needed has been taken over by the United States Government. The new building will be 145 x 43 feet, five stories high, of brick construction, and will be annexed to the No. 2 mill, making the latter mill twice its present size. Cards, drawing slubbers from No. 4 mill and spinning and intermediates from the No. 2 mill will be installed. These changes are made for the purpose of furnishing additional room for finishing processes in the No. 4 mill of the company. The weave shed will cost $35,000.

KING'S MOUNTAIN, N. C. The Anna Cotton Mill has been purchased from J. S. and S. A. Mauney by W. T. Rankin, C. B. Armstrong and associates for $104,000. The new owners, it is understood, will double the capacity of the plant, which at last report was equipped with 3.952 ring spindles and manufactured 20s to 30s cotton yarns. The number of spindles is to be increased to 9,000 or 10,000 as soon as the machinery can be procured and the new owners will erect 50 operatives' houses immediately. When the mill passes to the new management, 20s yarns, will be manufactured, and the comber waste from the manufacture of fine yarns in the Armstrong and Rankin chains of mills will, it is understood, be used. The mill has been in operation nearly twenty years. It is operated by water power, which at times has to be supplemented by electric power.

ESMOND, R. I. The Esmond Mills will construct an extension to its dye house and work will start at once. Contracts have been awarded the C. I. Bigney Construction Co. of Providence for the building. It will be of brick, mill construction, one-story high, with monitor roof.

Indicates previous mention of project.

NEWBERRY, S. C. Oakland Cotton Mills are installing two 7 x 3½-in. speeders, 160 spindles each, and 1,792 ring spindles, all within. This gives a total spindleage of 21,952 and 542 40-in. looms.

WILLIMANTIC, CONN. The American Thread Co. suffered a loss of $1,000 or more by a fire which occurred in the picker room of its No. 4 mill. The blaze was subdued by the fire brigade of the company, the greatest damage being caused by water. It is supposed that the fire started from spontaneous combustion.

BOSTON, MASS. The Massachusetts Thread Works, Inc., 694 Washington street, have retired from business.

FALL RIVER, MASS. Investigations are still being made to determine the cause of the explosion of the big kier at the Estes Mills which occurred recently. It is believed now that the safety valve of the kier became plugged with cotton waste or that the kier contained an unknown defect. The bomb or infernal machine theory at first advanced has been practically abandoned.

GARFIELD, N. J. The property of the Union Novelty Braid Works will be offered for sale on Jan. 10, the sale occurring on the premises at 11 a. m. This company comprises two tracts of land, together with a one-story frame and brick mill of about 14,000 square feet, machinery, transmissions, fixtures, etc. The stock on hand, dyes and chemicals, supplies, etc., will be included in the sale. Ae petition in bankruptcy was filed against the company some months ago, at which time W. W. Evans of Paterson was made receiver.

GASTONIA, N. C. A deal involving $300,000 was recently consummated when D. E. Rhyne of Lincolnton, N. C., sold the Rhyne's Cotton Mills of that place to J. Lee Robinson, J. L. Gray, J. H. Separk and others of Gastonia, N. C. The mill is equipped for the manufacture of fine combed yarn, with 12,096 producing spindles and fias a reputation or turning out a high-grade product in skeins, warps, tubes and cones. The name of the mills has been changed to Arrow Mills, Inc., and the main office will be at Gastonia. The new owners also own and operate the Gray Manufacturing Co. and Parkdale Mills, Inc., of Gastonia. The officers of Arrow Mills, Inc., are J. Lee Robinson, president; J. L. Gray, vice-president, and J. H. Separk, secretary and treasurer.

Wool

THOMPSON, CONN. The French River Textile Co. at Mechanicsville are building an addition 27 x 200 ft. to their weave-shed. It will be of brick construction and cost upwards of $15,000 excluding new equipment. The work is being done under the direction of Mr. Fisher of the Sayles Bleachery, of Saylesville, R. I.

JEFFERSON, MASS.. The new addition to the Jefferson Manufacturing Co. is nearing completion and will be ready for installing machinery within a fortnight. The building is built of reinforced concrete and wood, is two stories high, and 118 x 25 ft. It cost $20,000 exclusive of machinery.

*WASHOUGAL, WASH. Further details have been learned regarding the addi-

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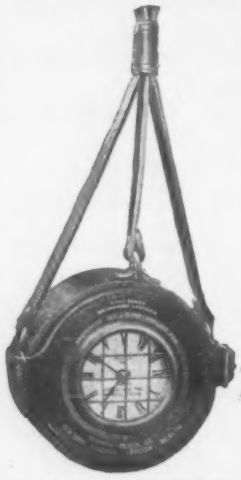

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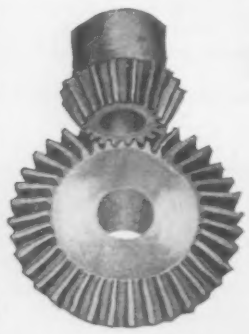

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GRAVITY and PRESSURE FILTERS

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WATER SOFTENING OR FILTRATION

FOR BOILER FEED AND ALL INDUSTRIAL USES
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MILL NEWS—Continued

tion to the Washougal Woolen Mills. The mill is controlled by the Pendleton Woolen Mills, who last fall purchased the Marysville Woolen Mills, of Marysville, Cal., and additions were made at Washougal to take care of that part of the equipment which they wished to keep. The remainder was sold to other mills on the coast. The additional machinery gives the local branch an equipment of 6 sets of cards, 7 mules and 31 looms, with a full complement of preparing and finishing machinery. The outlet is sold direct to the retail trade and at present the company is turning out a large amount of army blankets.

Knit

BLACKVILLE, S. C. J. M. Farrell is building a knitting mill here and expects to call it the Sunlight Hosiery Mill. The building will cost about $30,000, and will be equipped with Scott & Williams 200-needle automatic knitters Model K. G., which have already been ordered. Mr. Farrell expects to start making 400 dozen pair per day by June 1, and hopes to increase this to 1,500 dozen per day by June 1, 1919. The product will be finished and boxed at the mill, and yarns will be purchased, not manufactured, by the company. There will also be a mill village started and by June about $100,000 will have been invested in erecting bungalows for the operatives. Mr. Farrell advises his present intention is to specialize on half hose that will retail in normal times at 25 cents per pair, but the machinery he has purchased will make either hose, half hose or children's hose.

NEW ORLEANS, LA. A new plant is being built for the National Hosiery Mills. This new structure is on Montegut and Urquhart streets, and is of most modern construction. It is to be well ventilated and lighted and the floors will be creosoted pine block on concrete base. There will be rest and lunch rooms for the operatives. Moise H. Goldstein is the architect and C. E. and E. E. Reimann Co. have the contract for the construction. The present mill is located on Chartres street, but the growing business of the concern necessitated the erection of a larger and more modern plant. By the purchase of a half-square on Montegut street they are making provision for still further expansion. The mills manufacture men's and women's seamless hosiery, and there were at last report 75 latch needle knitting machines, 25 ribbers, and 4 sewing machines.

GLENDALE, L. I. The Arctic Knitting mills, formerly located at 2,433 Myrtle avenue, Brooklyn, N. Y., manufacturers of children's and ladies' sweaters, toques, scarfs, etc., will move their machinery to the plant in Glendale, recently vacated by Simon Asher & Co. The company has 25 knitting machines and 25 sewing machines in its Brooklyn plant.

BROOKLYN, N. Y. The Premier Knitting Mills, Inc., 97 Montrose avenue, have installed additional machinery. They manufacture novelty sweaters and slipons for the jobbing trade, and Nathan Kaplan is the president, with Irving Saltzman secretary. The plant has been in operation only a short time.

*GLOVERSVILLE, N. Y. E. C. Collins, secretary, treasurer and general manager of the Gloversville Knitting Co., which recently purchased a tract of land near its plant, advises that this land will probably be used for a new yarn mill and storehouse in the near future, but that the company is not yet ready to go into details. The company manufactures high-grade gloves and mittens, mitten linings and wool and cotton tubing, purchasing its yarns. At last report there was an equipment of 5 sets of woolen cards, 80 latch needle, 4 spring and 40 flat knitting machines and 25 sewing machines.

*NEW YORK, N. Y. Fedden Bros. Co., Inc., manufacturers of gloves, the details of the incorporation of which were given last week, will succeed the German Knitting Mills, which company has been in operation at the same address, 4283 Park avenue, for some time. The latter company has been dissolved.

NEW YORK, N. Y. Simon Ascher & Co., manufacturers of juveniles' and infants' sweaters, shawls, infants' wear and fancy knit goods, have moved into their new plant at 134th street and Third avenue. The machinery has been transferred from the old plant at Glendale, L. I., and the offices and stock rooms from Eighteenth street and Sixth avenue, but a show room will still be maintained at 390 Fourth avenue as heretofore. The new building is five stories high, of concrete construction. All of the manufacturing is done on the top floor, and each process of manufacture works downward from the top until the finished articles reach the shipping department on the first floor. The present partnership will be converted into a corporation which will have a capital stock of $1,500,000, divided into preferred stock paying 7 per cent and common stock in which the employes will be allowed to participate. The new style of the company will be Simon Ascher & Co., Inc.

*PHILADELPHIA, PA. The new plant for the Colonial Knitting Mills has been completed and the company has moved from its old location at Hancock and Somerset streets to the new building at Storkey street and Hunting Park avenue. The production has been increased so that in this month they will produce 1,500 dozen a day and increase same until they attain the maximum production of 2,500 dozen during the next six months. The foundation of the mill is built to carry six floors, but for the present the management has decided to build the mill with three floors. As business develops they hope, however, to use the additional floors. The mill was built under the supervision of H. A. Norris and Charles Chrstos, and incorporates every known facility to add to the comfort and efficiency of the operatives. Mr. Chrstos has also built a dye plant, which is of the most modern type. The officers of the company are Charles Chrstos, president; H. A. Norris, secretary and treasurer, and N. P. Quinlan, vice-president. The entire production of the mill will be sold from the New York office, through J. P. Quinlan.

Silk

*PATERSON, N. J. The recently incorporated firm of Bartson & Caswell, Inc., started operations at 117 Redwood avenue, Jan. 2, with a force of 20 operatives. Crepe de chines, crepe georgette, taffeta, grosgrains, satins and all other plain and fancies will be manufactured, but there will be no jacquard work. The company is capitalized at $15,000 and its officers are Charles A. Caswell, president; Octave J. Barton, treasurer; Albert J. Barton, superintendent and buyer. There are 24 looms in opera-

(Continued on page 459)

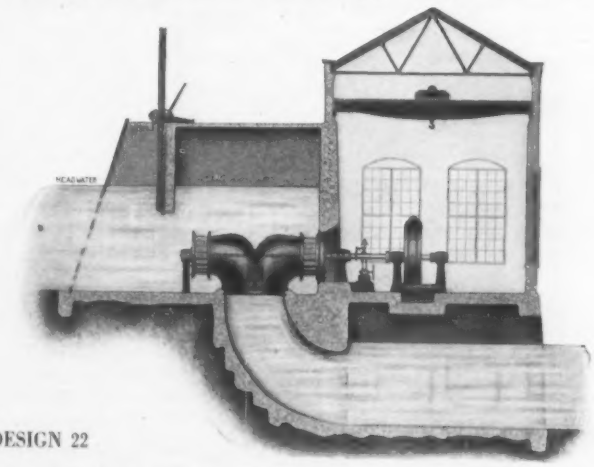
*Indicates previous mention of project.

LEFFEL TURBINE WATER WHEELS

VERTICAL and HORIZONTAL DESIGNS

High Speed, High Horse Power, High Efficiency

Low, Medium and High Head Units



DESIGN 22

Write for our Latest Turbine Water Wheel Bulletin 54

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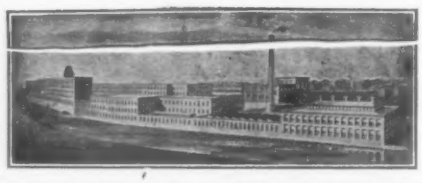

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There is Nothing "BRAND NEW" about our *experience, methods* or our record for honorable dealing. They go back OVER FIFTY YEARS. On the above basis we offer you FEEDERS for *cards, pickers and wool washers* that have stood the test and are not "Brand New" in the sense that you have to *experiment with any of our machines in your mill.*

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ALL STYLES AND KINDS FOR FLAT AND ROUND BRAIDS
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MINTERBURN MILLS COMPANY
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WOONSOCKET, R. I.
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WOOL MANUFACTURES

HEAVY-WEIGHT OPENINGS IN MEN'S WEAR FIELD

Factors in Trade Open Lines of Overcoatings and Suitings for 1918 Fall Season in Small Numbers

Business in the men's wear market has improved somewhat during the last few days and all indications point to a general increase in activity in the near future. General conditions are much better than they were a week ago and members of the trade are universal in the belief that good business will be forthcoming unless something unforeseen takes place. The cold weather, which served to retard activity in the market a week ago, has vanished and with the return of normal temperature buyers are visiting the market intent upon taking advantage of openings for the 1918 fall season. Stock-taking has been completed and the members of the trade are now able to give their undivided attention to fall business.

JOBBERS ACTIVE

Buying of light-weight fabrics is over as far as the primary market is concerned, but considerable business in spring merchandise is still being done by jobbers. Owing to the fact that a number of these purchased their stocks at an early stage they have been able to undersell both mills and agents for some time past. Jobbers' stocks have been materially reduced, however, during the last few weeks and it is reported that some of them are so hard-pressed to secure light-weight fabrics that they have been obliged to purchase from other members of their branch of the industry.

HEAVY-WEIGHT OPENINGS

The last week has witnessed a number of openings for the 1918 heavy-weight season and it is expected that many other factors in the trade will show fall lines in the early future. For some time past a number of firms have been quietly showing goods, and, owing to the limited extent of their lines and the general demand, have been allotting them to buyers on a basis of previous purchases.

Overcoatings were shown by the American Woolen Co. a short time ago, but other factors in the trade did not follow their lead until some little time had elapsed. A few lines of overcoatings were opened a few days ago and during the present week the number has been materially increased. Most of these have been of a staple nature, but there has been a sprinkling of fancy fabrics as well. Prices in accordance with predictions are uniformly high and since the date of opening several firms have found it necessary to advance them slightly. Buyers in the market are said to be disregarding the question of price to a large extent and are satisfying themselves with obtaining the necessary merchandise, regardless of cost. Such lines as have been shown have been limited in extent, but this was expected in view of the ever-increasing demands of the Government upon the machinery of the mills. Much of the selling which has already taken place has been done on a basis of allotment, as factors in the trade have found it impossible to satisfy the universal demand with their present supply.

SUITINGS EXPECTED

Several lines of suitings for fall of 1918 have already been shown and a number of factors in the trade have stated that they would show heavy-weight suitings within the next few days. In accordance with present-day conditions these will be largely of a staple nature, although a few fancies will undoubtedly be placed upon the market. Information has been received from an unquestioned authority that the largest factor in the trade will open additional lines of men's wear fabrics in the immediate future, although the nature and extent of the merchandise in question remains a matter of conjecture.

Men's Wear Trade Notes

George E. Kunhardt & Co. have opened lines of fancy overcoatings for the 1918 fall season. The fabrics in question are of various weights and are at prices ranging from $2.50 to $5.25 a yard.

De Lamater Co. recently opened a line of 25-oz., all wool staple overcoatings at $2.75 a yard. After being on the market the price was raised to $3 a yard and shortly after announcement was made that the line had been sold up and withdrawn.

Styles for men's clothing as recently shown by the Clothing Designers' Association exhibition at the Hotel Breslin reflect the spirit of conservation of materials for the fall and winter season of 1918. The Association followed the recommendations of the Commercial Economy Board closely and the new styles are calculated to save ⅛ of a yard of material on each suit and ¼ of a yard on each overcoat. Patch pockets, pinch-back effects, vents, coat cuffs, belts and pleats have been abolished, although novel effects have been produced by means of fancy stitching. Pocket flaps and coat lapels are narrower than formerly, while coats are extremely tight and short, the conservative length being about 29 inches. Waistcoats are made without collars while trousers are narrower than ever before.

Battey, Trull & Co. have opened a line of staple and fancy overcoatings for fall of 1918. The fabrics are 27-oz. and 28-oz., with prices at $3.25 and $3.50 a yard respectively.

H. Sanders & Co. are showing a line of fancy suitings of the Empire Worsted Mills.

S. H. & O. B. Newhouse have recently opened their lines of Stanley and Doncaster cotton-warp fall suitings.

To Maintain Wool Rates

WASHINGTON, D. C., Jan. 8.—The Interstate Commerce Commission has issued an order authorizing the Colorado & Southern Railway and its connections to maintain rates for the transportation of wool and mohair from points in Colorado and Wyoming to Philadelphia, and Baltimore via Galveston, Texas and water lines to New York City, the same as the rates in effect on like traffic from and to the same points via other and more direct routes.

Colonial Wool Auctions

Frank B. Windeler, representing the British Board of Wool Control, announces through the Textile Alliance, that the next auctions of Australian wool have been fixed to take place on Thursday, Jan. 24, and Friday, Jan. 25. Details as to quantities to be offered will be announced later, as will be the time and place at which sample bales will be shown.

LITTLE ACTIVITY IN PRIMARY MARKET

Quiet Conditions in Dress Goods Trade Continue—Coating Production to Be Limited

Quiet which has existed in the dress goods market for several weeks still continues and there seems to be little possibility of business improving to any great degree in the immediate future. Consumer demand which is never regarded as an important factor during January has fallen off until there are few sales being made by retail establishments and department stores. Demand on the part of cloak and suit manufacturers which should be relatively good at this time has decreased to a marked degree and very little activity is being exhibited in the primary market. As the result of heavy buying which was indulged in by clothing manufacturers a large majority of these firms find that they are in possession of ample stocks of staples, which are in chief demand and accordingly show little desire to re-order at the present time. Even should these firms enter the market for spring fabrics it is doubtful as to whether or not they could be accommodated in view of the shortage of merchandise now existing. Mills and agents have but little for sale and the bulk of stock now reposes in the hands of the jobbers.

JOBBERS PROSPEROUS

Good business is being enjoyed by jobbers and more activity exists in jobbing circles than in any branch of the trade. Owing to the fact that these houses were wide awake and purchased heavily at the beginning of the spring season they have found it possible, in many instances, to undersell the mills themselves who have been obliged to increase their prices during the course of the season. Demand has been so great, however, that a number of these firms are coming to the end of their rope and find themselves with comparatively little to offer. Recent trade gossip has it that a number of jobbers have had their stocks depleted to such an extent that they have been obliged to purchase from their competitors in the trade.

Manufacturers of cloaks and suits continue optimistic with respect to the spring season and report good sales especially throughout the middle western territory. Indications are that suits will enjoy considerable popularity. Inasmuch as these have not been in as great demand as separate cloaks and skirts the prospects are being pleasantly contemplated by firms specializing on the former garments.

Openings for the fall season will be later than usual this year and whereas a number of firms had contemplated opening lines early in January by far the greater number will show goods late in the month and early in February. The last week has witnessed the advent of a number of buyers in the dress goods market but the greater number of these contented themselves with inquiring as to the nature of fabrics to be offered and prices which were to prevail and made little or no effort to purchase merchandise. Owing to the fact that Government demands are growing greater the chances that a number of firms will dispense with formal openings and will dispose of their output by means of allotment are increasing.

COATING SHORTAGE PREDICTED

Government demands for overcoating and blanket material have increased greatly and the amount of machinery at work on these fabrics is steadily growing larger. Already production has increased to such proportions as to offer a serious menace to the production of civilian cloakings for the fall season of 1918. Openings of cloakings, which are expected in the near future will be much smaller with respect to number of fabrics shown than heretofore and will be confined principally to staples. Predictions are current to the effect that coatings shown will be lighter in weight than in former years. One report recently received is to the effect that one of the most prominent factors in the trade will offer a limited range of coatings with nothing being shown over 14-oz. Such a fabric would necessitate interlining as well as lining in order to bring the fabric up to a weight sufficient to withstand the cold.

Dress Goods Trade Notes

Predictions are current to the effect that the fall opening for 1918 will be extremely limited with respect to the number of fabrics shown. It is stated that one of the important factors in the trade will confine itself to only one serge and one poplin in place of the extensive line it has previously placed upon the market.

Operations in the cloak industry have been seriously hampered during the past week owing to the serious fuel shortage which has prevailed. Numerous factories have been compelled to shut down owing to lack of heat and power and this in turn has resulted in several thousand workers being thrown out of work for the time being.

Phila. Strike Situation

The following statement regarding the strike situation which has existed among the broad loom mills in Philadelphia since October 2, has been made by Henry Morgan, Secretary of the Cloth Manufacturers' Association:

"There are virtually no looms vacant now in any of the factories. Where the old workers have refused to return, according to the terms of the original schedule of a 10 per cent increase, we have instructed new labor, and their output has been very satisfactory.

"At present there are only 350 looms unoccupied. The strikers are returning to their old places every day. While the trouble lasted the Government was losing 200,000 uniforms. The mills have now reached the old standard of production and are turning out 25,000 uniforms every week.

"So favorably has the situation turned out that many of the textile manufacturers are not only maintaining the former output, but are actually working to pick up what was lost during the strike. They are now working on Government contracts instead of civilian clothes. Inside of a month we shall have made up the 200,000 uniforms lost because of the strike."

The strikers who are still out declare they will call a general strike of all textile mills unless their demands are granted. At a recent meeting six delegates were appointed to unite all branches of the textile workers for concerted action. The labor expert of the Department of Labor will again attempt to prevent the extension of the strike.

Tank Service Without Leaks

There are great differences in steel tanks.

It takes engineering knowledge and a good long experience in tank building to produce a tank that will give real satisfaction year in and year out.

We have been building tanks for thirty years and **we know** that every Caldwell Steel Tank is correctly designed, properly riveted and built for maximum service.

Send for Catalogue

W. E. CALDWELL CO.
Incorporated
2060 BROOK ST. LOUISVILLE, KY.

Caldwell TANKS AND TOWERS

WILLIAM BODDEN & SON, Limited

The "BODDEN" Flyer

For QUALITY OF FINISH
For QUANTITY OF PRODUCTION
HAS STOOD THE TEST OF YEARS

Sole Agents for U. S. A.
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Textile Mill Crayons

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White and Colored Chalk

Send for Samples and Price List of Our

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FOR EVERY USE

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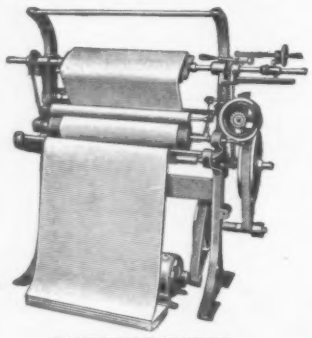
MASON MACHINE WORKS

TAUNTON, MASS.

REVOLVING FLAT CARDS.
DRAWING FRAMES.
SPINNING FRAMES.
COTTON LOOMS.
SILK LOOMS.
DOBBIES.
TIRE DUCK LOOMS.
MEDIUM AND HEAVY DUCK LOOMS.

SOUTHERN OFFICE: GREENVILLE, S. C.

CLOTH WINDERS



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THE VERSATILE LANCASHIRE

has an adaptation for every fabric, every difficulty and every pocket-book

Silks its specialty
Cottons made for it
Woolens simplest of all

Parks & Woolson Machine Co
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TEXTILE MACHINERY

Cotton Mill Equipment including pickers; cards; drawing; evener drawing roving, spinning, twisters; slashers; spoolers; reels; winders; warpers.

Worsted Machinery including revolving creels; gill boxes; drawing frames; reducing and roving frames; cap, ring and flyer spinning and twisting frames; jack spoolers.

Spun Silk Machinery including spreader; filling engine; drawing frame; fly frames; spinning; gassing spooler; trap spooler; twister.

Complete Waste Reclaiming Machinery.

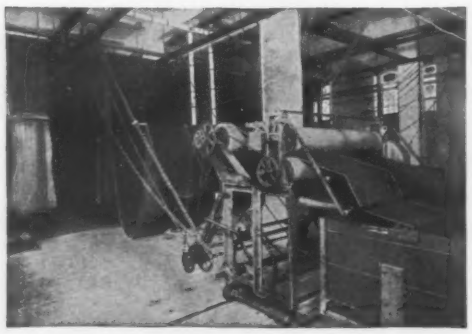
Executive Offices:

77 Franklin Street, Boston, Mass.

Shops:

Biddeford, Me. **Newton Upper Falls, Mass.** **Lowell, Mass.**

Southern Agent: **Rogers W. Davis, Charlotte, N. C.**



RELIANCE CLOTH Shrinking and HANGING MACHINE

For shrinking woolen, worsted and cotton goods; drying oilcloth, or waterproof cloth, and curing rubberized cloth.

In use by the United States Quartermaster Department for shrinking uniform cloth.

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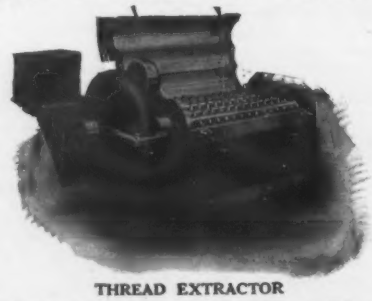
RELIANCE MACHINE WORKS, Frankford, Phila.

Machinery to prepare, card and spin various kinds of COTTON WASTE

Complete Plants for
Cotton Wadding,
Medicated Wool,
Cotton Blankets,
Sponge Cloth,
Yarn, etc.



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Engine Cleaning,
Waste Machines,
Hard Waste Breakers,
Thread Extractors,
Rag Pickers, etc.

For Card and Spinning Room Sweepings, Clearer Caps, etc.

WM. TATHAM, Limited. **Rochdale, England**
Agent, WILLIAM FIRTH, 200 Devonshire Street, Boston, Mass. Established 1866

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ESTABLISHED 1878 LOOK AT THE CLOTH

Manufacturers of plain and fancy serges, skein dyes, vigoureux, and fancy piece dyed fabrics for ladies' and gentlemen's wear; uniform cloths a specialty. Also worsted yarns for weaving and knitting.

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Spinners, Weavers, Dyers
GEO. H. HODGSON
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Cleveland, Ohio, U. S. A.

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THIBETS
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BROADCLOTHS
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TALBOT MILLS
ESTABLISHED 1857
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Our fabrics are well known to the trade as the standards in their class — The Talbot Mills trademark is recognized as an assurance of quality which is never lowered.
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French **TEASELS**
JACOB N. CHESTER
109 Broad Street :: New York

Perforated Plates for Wool Washing
Rinsing and Carbonising
In Special Metal
Beckley Perforating Co.
Garwood, N. J.

BOSTON WOOL STOCKS

Exceed Those for Previous Year Considerably

The stock of unsold wool in the Boston market December 31, 1917, as computed by the Cooley & Marvin Co., accountants for the Boston Wool Trade Association, and as made public by F. Nathaniel Perkins and Edward R. Peirce, the stock-taking committee, was as follows:

	Grease, Lbs.	Equivalent Scrd. Lbs.
Territory, California, Texas	13,292,003	5,426,579
Fleeces (grown east of the Mississippi River and Minnesota, Iowa and Missouri)	6,073,355	2,440,492
Scoured	2,837,713	2,837,713
Tops	576,466	576,466
Noils	1,541,414	1,541,414
Pulled (in grease)	1,006,997	647,498
Foreign, Class 1 and 2	19,698,381	10,520,915
Foreign, Class 3	1,875,068	1,077,021
Foreign, Pulled (in grease)	1,257,479	898,323
Foreign, Scoured	8,445,589	8,445,589
Foreign, Tops	418,130	418,130
Foreign, Noils	1,002,687	1,002,687
Miscellaneous	402,333	402,333
Total	58,727,615	36,535,160

"The stock of wool and tops on hand held by the Quartermaster Corps, U. S. A., and for account of the Navy Department, not allotted to manufacturers, are not included in the above report."

The stock last year, not including tops and noils, was 44,099,484 pounds, and for the previous year, 57,203,429.

Coal Shortage Curtails Power

Until the coal shortage is over the Public Service Electric Co., which serves large numbers of textile mills in six counties of northern New Jersey, including the cities of Paterson and Passaic, will furnish power for industrial purposes only three days a week, and then only between the hours of 7 A. M. asd 4 P. M. At other hours it will all be required for trolley service and lighting. Mills in Essex and Bergen counties will be served on Mondays, Wednesdays and Fridays, and those in Hudson, Passaic, Union and Somerset counties on alternate working days.

Textile Club Dinner

The January dinner of the Boston Textile Club was held at Young's Hotel last Saturday afternoon. About 60 members and guests being in attendance. Major Boyer, in charge of Canadian recruiting in New England, was to have been the speaker, but was unexpectedly called to New York and his place was taken capably by Corporal Steele, of the Canadian recruiting staff, who gave an interesting talk on his experiences in the trenches. President Lewis Dexter presided.

Calendars

The Tattersfield Co., Philadelphia, Pa., is issuing a most useful desk calendar. The separate cards for the twelve months are enclosed in a leather frame with standard, thereby making a substantial gift which can be utilized from year to year. The company also extends best wishes for the New Year on a separate card.

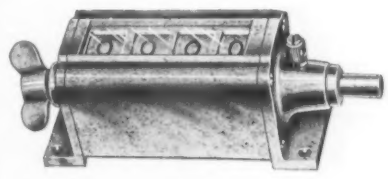
The Draper Corporation, Hopedale, Mass., have sent to their customers and friends their usual daily wall calendar which fills an important place in the busy office.

Marden, Orth & Hastings Corporation, chemicals, dyes and dyewood extracts, New York, are distributing their 1918 wall calendar for which there is always a demand.

Link-Belt Co., Chicago, Ill., announce the readiness of their yearly wall calender and they will send them upon request to responsible firms.

Most Any Method Requires Them

You know more ways than one to speed up production—but practically *all* methods require a *count* of production to show whether each operative speeds up, and how much.



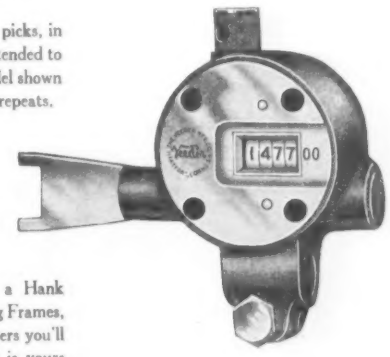
At the left is the counter which measures the output of finishing machinery—Drying, Mangling, Tentering, Napping, Dyeing, Calendering Machines, etc.—registering yardage of material passing over the front roll. Set back to zero by turning knob.

Use the above counter either for paying help on a piecework basis, or by the *task* method of setting a *standard output* per operator.

Veeder
COUNTERS

—fit special needs in a special way; there's a complete line for textile and thread-winding machinery. Take the Loom Pick Counter below, for example:—

This counter registers the output in picks, in units of 100 or 1000—as ordered. Intended to be driven by the crankshaft, the model shown counts up to 1,000,000 picks—then repeats.



The counter reads in plain figures; saves mistakes and disputes among those unfamiliar with counters—an important feature when you "pay by the pick," with the operative reading the record

You can get a similar model in a Hank Counter—for Roving, Drawing, Ring Frames, Mules, etc. This is one of the counters you'll see in the Veeder Booklet—a copy is yours —*address*—

The Veeder Mfg. Co. 36 Sargeant St. Hartford, Conn.

The Gear Type Machine

A portable Foot Power Sewing Machine for general use in sewing Woolen, Cotton, Burlap and other fabrics in mills, dye houses, print rooms, bleacheries for piece end sewing of any weight goods, either wet or dry. This Gear Type Machine is carefully constructed, all gears having accurately fitted machine cut teeth, and the Sewing Head operates without arm or connection. Further information furnished upon application.

TILLINGHAST
SUPPLY & MACHINE CO., INC.
142 Kneeland St., Boston, Mass.

COTTON MANUFACTURES

EXPORT DIFFICULTIES GET LITTLE RELIEF

South American Lines Pool Tonnage and Storage Facilities for General Good—Active Reselling Business

Nothing is as it used to be in the cotton goods export trade. The smooth-running machines built up by the hard work of men long associated in that branch of the cotton goods business, has not been the same since war measures took to tinkering with its fundamentals. While the war cut off a considerable competition that American cotton goods had formerly to meet and left certain markets dependent on American goods, it also scattered obstacles with the prodigality of war. The opportunity offered by the augmented demand from foreign sources certainly looked good, and it is not surprising that it resulted in an unusual amount of speculative trading.

Not a few export buyers padded their original contracts on the strength of an increased outlet. Some of them, it is estimated, doubled up on them. The blacklist upset the calculations of all concerned, which accounts for the large volume of odd lots that have been dealt in and for the rather active second-hand business that has been going on. In the beginning certain agents discountenanced it, on the ground that it upset the machinery of regular business, until it became more and more manifest that there was a superabundance of this blacklist merchandise to be reckoned with. More recently this business, it is said, has outpaced the regular market. As one well-known factor remarked, "We weren't in love with it at first, but we are practically living by it at present."

MIXED CONDITIONS

South Africa is mentioned in several quarters as actively interested in many lines of cotton-piece goods, especially in bleached and unbleached cottons. The foreign demand from all quarters bulks so particularly on goods which are scarce at present that the unsatisfied demand looms large. The blacklist blocked so much business in the hands of enemy alien firms, throwing so much more on the shoulders of friendly firms that those firms are struggling with problems of their own, not the least of which is an inability to secure goods.

LINES POOL TONNAGE

In addition to shipping troubles by water, domestic embargoes on rail transportation have embarrassed exporters as grievously as they have domestic shippers. Shippers to South America have been afforded a measure of relief by the pooling of tonnage by six South American steamship lines, and who have agreed to take any freight when ready on the first boat available, regardless of which line it may be assigned to. These lines also agree to a joint storage system whereby cars could be unloaded without waiting for the arrival of steamships. The expectation is that other lines would follow this course.

Sweden Requisitions Cotton

In accordance with a royal decree the Government of Sweden has requisitioned all supplies of cotton, carded and uncarded, with the exception of cotton which is free from fat (so-called bandage cotton).

COMPARISONS OF WAGES

All Divisions Except Silk Show Increase for October

WASHINGTON, D. C., Jan. 8.—The Bureau of Labor Statistics, Department of Labor, has just completed its survey of the changes in labor conditions and wages for the month of October comparing this year and last year.

The figures are compiled from reports rendered by representative establishments in thirteen different industries. The comparison of October, 1917, with October, a year ago, indicates a decrease in 7 of the 13 industries as to the number of persons on the pay roll. The silk industry shows the greatest decrease—9.6 per cent. On the other hand, the increase in several industries was favorable.

With respect to the total amount of the pay roll all the industries show an increase in October, 1917, except silk, as compared with October of last year. Woolen indicated an increase of 41.6 per cent. Taking up the matter of wage increases during the month of October in industries of interest to our readers the report says:

"There were five establishments in the hosiery and underwear industry which granted a 10 per cent increase in wage rates to all employes. Two establishments in this industry gave a 15 per cent increase to all persons on the pay roll. Two other plants reported a 10 per cent increase, affecting 95 per cent of the force in one of them and 50 per cent of the force in the other. One plant gave a 10 per cent increase and another granted a bonus of 11 per cent, but neither stated the proportion of the force affected.

"In cotton manufacturing three establishments reported a 10 per cent increase, this affecting all operatives in two of them and approximately all in the third. One plant gave an increase of about 6 per cent to all employees, and another granted a 10 per cent bonus.

"Forty establishments in the woolen industry reported a 10 per cent increase, affecting all employes on the pay roll. One plant gave a 5 per cent increase to the entire force.

"In the silk industry three establishments reported increases. There was a 10 per cent increase to 55 per cent of the force in one of them, a 7 per cent increase to 15 per cent of the force in the second, and a 5 per cent increase to all persons on the pay roll in the third.

"In cotton finishing one plant gave an increase of $1 per week to each employe, while another reported an increase of 2 cents per hour to all receiving 23 cents per hour or less. A third establishment gave all employes a 10 per cent increase."

Modifies Cotton Export Ban

The War Trade Board has amended the ruling in regard to the exportation of raw cotton as follows: "On Jan. 8, 1918, and thereafter until further action is taken by the board no individual licenses shall be required for the exportation of raw cotton to the United Kingdom, France, Italy or Japan, or their colonies, possessions or protectorates, with the exception of Egyptian or Sea Island cotton, the exportation of which to any country will on and after that date require an individual license."

COTTON GOODS STRONG; BUYERS CONSERVATIVE

Both Buyer and Seller Show a Thoughtful Conservatism—Shortage of Certain Lines Seems Probable

The market at this writing is showing the effects of the extreme activity of the last quarter of 1917, and conservatively maintaining its strong position. The evident determination of manufacturers to hasten shipments and to clear out, so far as possible, the accumulated goods at the mills is shown by steps being taken to press deliveries. In some cases the wishes of buyers are not consulted. On the other hand, buyers from distant points are willing to waive every other consideration for the sake of insuring deliveries. Many mills are sold so far ahead to points in the future that no disposition is shown to go much further. The unusual scarcity of spot goods in all staple lines has more than anything else contributed to convince buyers of a threatening insufficiency of goods to meet their ultimate requirements.

TRANSPORTATION FIRST

The unfortunate condition of transportation, aggravated by weather that made a bad situation almost impossible, has awakened buyers, and the nation as well, to a state of affairs little short of calamitous. The food and fuel needs come first, so that even Government priority is thrust aside under the pressure of things essential to the subsistance of the people as a whole. Buyers argue that mill deliveries mean little to them except an addition to their general plight. The Government is strict in its definition of priority privilege, so that merchandise entitled to preference must be consigned to parties who actually ordered the goods for the Government.

BUYERS QUITE CONSERVATIVE

Buyers are arriving in increasing numbers but are trading conservatively, with an eye single to staple goods, which on present indications promise to be scarce later in the season. Caution is the keynote from both the buyers' and sellers' viewpoint. Certain lines of white skirting Bedford cords, whip cords, etc., seem to have been neglected because the price, while not dear, does not fit into the buyers' scheme of things and would necessitate an awkward retail price. As the retail price is in a measure the jobbers' guide, he passes these in-between prices, even though he admits their fairness. Black sateen for linings and petticoats are said to be sold freely for delivery to June. Considerable stocks of fancies which were slow some time ago are being moved at a profit because of the increased cost of plain goods.

GRAY GOODS VERY STRONG

The gray goods market is generally reported bare of spot goods. There has been a limited quantity of cloths at second hand until now even that source of supply seems exhausted. That there was no extraordinary speculative buying during September and October is evidenced by the fact that relatively small quantities have, after all, been offered at second hand. Had there been much free merchandise during December, when prices held stationary for weeks at a time, more would have shown up then. Certain large converters did release a share of their supplies in expectation of covering at a lower figure before the goods should be actually needed. At present the seller can name his own price, according to today experience, and get it.

HEAVY COTTON GOODS SCARCE

Commission houses with cotton huck towels to sell show an increased activity in that department. A representative gathering of buyers, it is expected, will be in attendance at the jobbers' meeting, on the 14th to 17th inst. Prices on Cantons and narrow napped goods will be generally made about that time. The scarcity of heavy colored cotton goods, denims, etc., is pronounced. Many mills are reported as sold up to June 1, and in individual instances beyond that date. A prominent factor in the gray goods trade remarked that they had forwarded all invoices on the date that goods were cased at the mills ready for shipment and had not received a single objection to the rule, notwithstanding shipping delays.

Cotton Goods Trade Notes

Taylor, Clapp & Beall announced the following price advances: Hope, 4-4 bleached, to 17c. Forgetmenot, 4-4 bleached, to 16c.

In calling attention to their Heather plaids, Marshall Field & Co. predict that, from indications, plaids will be the vogue for the coming spring season. The Heather plaids referred to are printed designs, in printing and coloring closely resembling the woven fabrics. This is in confirmation of probabilities given in these columns two months ago.

"Mayflower" nainsook is a new brand offered by S. H. Howe, 58 Leonard street, agent for the King Philip Mills. It is a 36-inch cloth, folded 9 x 12 in an attractive wrapper, 12 yards to the piece, 50 pieces to the case. Samples on request.

The Sidney Mills, converters, removed from 123 Bleecker street to 334 Fourth avenue. J. Berlin & Sons, proprietors.

The Potter Textile Co., 456 Fourth avenue, fine cotton goods, has increased its capital from $110,015 to $180,015.

The annual convention of the national dry goods jobbers begins next Monday. It is expected that many buyers will be present.

Cannon Mills have established a branch office in St. Louis. The office is located in the Syndicate Trust Building and is in charge of Fredrick W. Howe. Mr. Howe formerly covered the St. Louis territory from the Chicago office of Cannon Mills.

Cloth goods that are most wanted are most hard to get. The market is very firm, on a basis of 12c. for 64 x 60s, and mills holding, according to statements, at 12¼c.

W. S. Prankard has been elected vice-president of Converse & Co. It will be remembered that Mr. Prankard was of the firm of Jarvis & Prankard, selling agents of the Amoskeag Manufacturing Co., where his association extended over practically 25 years through the various changes of firm title.

Mathews, Butler, Pfaffman & Co. is the style of the new firm at 102 Worth street, wholesale cotton goods, linings for women's and men's trades and export specialties. With one exception the members of the new firm have spent their business careers with J. W. Goddard & Sons, Inc.

GARLAND

LOOM HARNESSES

Are made of the best material it is possible to procure and are finished with the utmost care by men of many years' experience. The best material with skillful handling is bound to produce good results, and it is for this reason that the quality of our work is always the same.

TRADE MARK

GARLAND MFG. CO.
SACO, MAINE

A. M. Law & Company
Spartanburg, S. C.
Dealers in
Southern Mill Stocks
Located in the center of the Southern Cotton Manufacturing. Twenty years in the business.
CORRESPONDENCE SOLICITED

Cotton mill stocks in general have all witnessed a material advance. Write for latest quotations on all such stocks in which you are interested.

MORTON LACHENBRUCH & CO.
Specialists in Mill Securities
Equitable Building New York City

Business News

New Industrial Development

The Missouri, Kansas & Texas Railway has adopted through its industrial department, R. W. Hockaday, industrial commissioner, St. Louis, Mo., the plans of giving its personal service to the towns and cities along its lines, by which means they may present their merits and advantages to the attention of manufacturers and others who may be interested or desirous of locating on or along its lines. The various towns and cities have been asked to prepare surveys of their resources and advantages in order that such data may be presented to manufacturing concerns and individuals who may be interested in the establishment of industries in Oklahoma and Texas, and the other states traversed by its lines. The great volume of gas and coal production in Oklahoma and the increasing markets in that state and Texas, where also climatic conditions are favorable, and labor, particularly female, is awaiting employment, provide exceptional locations in those states for manufacturing interests.

This railway has recently enlarged its industrial department by the appointment of five industrial agents, through whom data concerning the territory, towns and cities along its lines will be furnished to inquirers, both industrial and agricultural, who may be interested in a location of either character in the territory which it traverses. These five industrial agents are as follows:

L. B. Chipley, Eastern territory, including New England, with headquarters at Boston, Mass. C. E. Osborne, the Central East, with headquarters at Pittsburgh, Pa. L. E. O'Leary, the Ohio Valley, with headquarters at Cleveland, Ohio. A. Bryant, the Central West, with headquarters at Chicago, Ill. C. L. Knox, the Missouri River Valley, and Western territory, with headquarters at Omaha, Neb.

The advantages of this plan to the towns and cities along its lines are obvious, particularly so to the smaller towns financially unable to maintain a publicity service through which to present their claims to manufacturers, farmers and others interested in locations in the Southwest. Inquiries from such interests for any information desired may be addressed as above.

Calendars

Another attractive calendar has been received from the Sherwin Wool Co., Boston, Mass. This also bears a reproduction of one of F. R. Harper's patriotic paintings. The plant of the company is shown above the calendar card, the whole being set off with red, white and blue colors, forming a most striking effect.

The McCarty Aniline & Extract Co., New York, is distributing a most unique calendar. Individual cards attached to a brass standard give the different dates and months of the year, each card bearing a colored plate of the shield of the United States with flags of the allied nations.

The Draper Corp., Hopedale, Mass., is sending out to its friends and customers a very striking calendar. A photograph of the company's works and surroundings produces a most picturesque effect, this being offset by a dark green card covered with cotton blossoms and their vivid green leaves. At the top of the card is a reproduction of a Northrop loom, while interspersed with each calendar sheet is a separate sheet for memoranda.

L. F. DOMMERICH & CO.
Finance Accounts of Manufacturers and Merchants
Discount and Guarantee Sales
General Offices
254 Fourth Avenue
NEW YORK

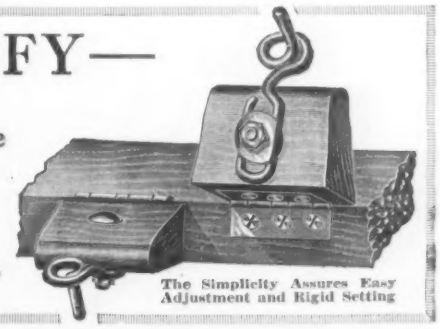
Established 1868
G. K. SHERIDAN & CO.
Commission Merchants
39-41 Thomas Street NEW YORK
COTTON DUCK
SAIL WIDE ARMY

REMY, SCHMIDT & PLEISSNER
MILL AGENTS AND COMMERCIAL BANKERS
are open for the selling agency of a mill manufacturing
Cotton Huck and Turkish Towels
Bath mats, wash cloths, scrub cloths
443 to 449 Fourth Avenue
Corner 30th Street NEW YORK

WATTS, STEBBINS & CO.
SELLING AGENTS
44-46 Leonard St. New York
Brown and Bleached Sheetings, Shirtings, Drills Cambrics, Longcloths, Lawns and Nainsooks
For Home and Export Markets

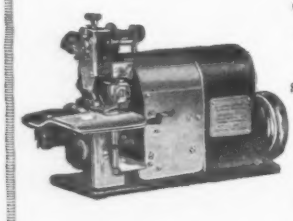
Established 1796

Special shaped carbon, black diamond, **pointed tools for** turning paper, rag, corn husk and cotton **calender rolls,** hard rubber, fibre, etc.
Manufactured by
Thos. L. Dickinson, Successor to
JOHN DICKINSON, 64 Nassau St.
NEW YORK CITY

—SPECIFY—
The Palmer Improved Adjustable Thread Guides
on your Spinning and Twisting Frames.
The I. E. Palmer Co.
Middletown, Conn.

The Simplicity Assures Easy Adjustment and Rigid Setting

Reeds and Combs of All Descriptions
FOR ALL CLASSES OF WEAVING
TEMPERED STEEL REEDS
Working Samples Sent Free of All Charges on Receipt of Particulars
THE LOOM REED AND HARNESS CO.
CHARLOTTE, NORTH CAROLINA

MERROWING



OVERSEAMING
OVEREDGING
AND
SHELL STITCH
MACHINES
FOR
FINISHING
ALL KINDS

Knitted and Woven Fabrics

THE MERROW MACHINE CO.

HARTFORD, CONN., U. S. A.

The "NO-WASTE"

Seamless Hard Fibre

ROVING CAN

gives the satisfaction you have so long desired. Having *no seams or rivets* to strain and break the sliver, it withstands the roughest of treatment. Glossy surfaces both inside and out insure *absolute smoothness.*

also

Fibre and steel Clad Cars, Doffing Trucks, Mill-Boxes, Sheet Fibre Tubes, Rods—special shapes.

STANDARD FIBRE CO.

25 Miller Street Somerville, Mass.

SCHOETTLE PAPER BOX CO.

RALPH J. SCHOETTLE, Manager

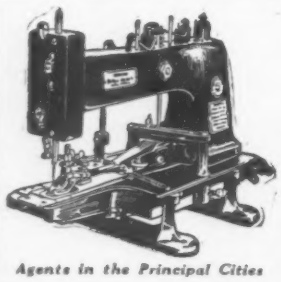
WE ARE MAKING A SPECIALTY OF

SILK HOSIERY BOXES

MANUFACTURERS AND JOBBERS WILL DO WELL TO CONSULT US

TRADE MARK AND SPECIAL BRAND PAPERS CARRIED IN STOCK

Front and Laurel Streets Philadelphia, Pa.



Agents in the Principal Cities

THE USERS ARE SATISFIED

More than 3000 of 'em. Their experience with

The Union Button Sewing Machine

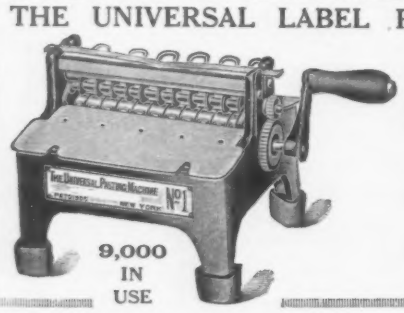
is worth looking into. Send for list of users and Samples.

FREDERICK OSANN COMPANY

245 Seventh Ave. NEW YORK
Phone Farragut 8820

394 Atlantic Ave. BOSTON
Phone Fort Hill 1511

THE UNIVERSAL LABEL PASTING MACHINE



9,000 IN USE

THE QUICK MODERN WAY OF APPLYING PASTE TO LABELS OR ANY OTHER SURFACE OR WATER TO GUMMED LABELS

PAYS FOR ITSELF IN ECONOMY OF PASTE

Saves Time and Labor

E. W. S. JASPER
Selling Agent
120 Liberty Street, New York

The RIGHT Kind of Soap

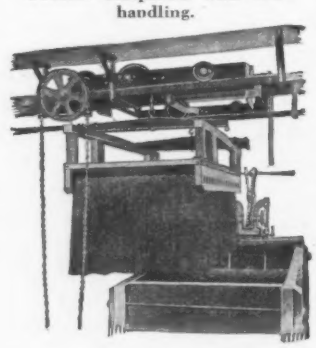
The wide-awake mill man uses *only* that kind of Soap which will give his goods a finish in harmony with its quality. Be "particular"—demand

"STANDARD SOAP" PRODUCTS

Made for every Textile use. Purity guaranteed. Prices reasonable. We will gladly send you samples at your request.

STANDARD SOAP MFG. COMPANY
WOONSOCKET, R. I.

Process completed with one handling.



BLEACHING

With one concrete and two or three Wood HUSSONG Machines, one operator will do the work of four to six men, will deliver your yarn freer of Chlorine, and in better winding condition than is possible by any other means, and a bleach that is second to none.

Patentees and Manufacturers.
HUSSONG DYEING MACHINE COMPANY, GROVEVILLE, N. J.

REFINITE

REGISTERED U.S. PATENT OFFICE TRADE MARK

514 Farman Building
OMAHA - - NEBRASKA

makes water 100% soft at less cost than any other method.

WEIMAR BROTHERS

Manufacturers of

TAPES, BINDINGS and NARROW FABRICS

2046-48 Amber Street, Philadelphia

NEW ENGLAND TANK & TOWER Co.

EVERETT STATION
BOSTON MASS

WOOD TANKS FOR ALL PURPOSES

Dobbins Soap Mfg. Co.

PHILADELPHIA

Makers of Soaps Especially Adapted for All Kinds of Textile Mfrs. Use. Send for Sample

KNIT GOODS

WOOL HOSIERY LINES NOT UPON MARKET

Active But Insatiated Demand for Wool Socks—Few Agents Have Small Case Lots for Customers

About the only action in the hosiery market is a large demand for wool lines. Thus far this demand remains far from satiated, and there is little prospect of its being fulfilled. Nearly the entire production of heavy wool socks until October has been taken by the Government, according to reliable estimates, and opinion is that the year's production will be taken. Now and then small case lots are found among selling agents, but their disposal is strictly confined to former customers and not reaching the open market. There is little or no basis for quotations, but in a general way they can be said to be all the way from 60 to 100 per cent above last year's levels.

Manufacturers are closely watching the wool and yarn situation but as yet a clarifying development has not resulted from Government intervention. Of course, the latter has been only for wool to cover war requirements, but it was hoped that such action would have a sympathetic effect on the wool and yarn markets as a whole. Labor scarcity and shipping difficulties are bothering hosiery production in no small way; while Government direction of the railroads is expected to alleviate the former there is no relief in sight for the absence of labor. The coming draft, it is expected, will further deplete labor ranks, but it is likely that some steps will be taken to ask a class exemption of skilled hosiery workers.

COTTON LINES QUIET

Quietness features cotton hosiery. Demand is comparatively small and few buyers are in the market. Inquiries, however, are becoming more numerous and it is more or less general opinion among selling agents that within the next few weeks demand will be materially stimulated. The acute scarcity of wool hose should react to the benefit of cotton lines, and producers of the latter seem to be in a fair way toward a successful year.

Just now a majority of manufacturers are covered as far ahead as they can be, and are not attempting to attract further orders. Business has been booked to the extent that manufacturers are covered with yarns and cottons, and this is as far as they will take orders. Basing predictions on the latter, selling agents see nothing but continued advances for hosiery. Jobbers, however, have not covered to the extent they care to be, yet despite the acuteness of the situation no little opposition to high prices is met. Particularly is this true of the cheaper lines, where appreciations have been most radical. Jobbers are seeking for lines that can retail at 25c. a pair, but about all they can find to sell at this figure are lines that previously retailed at from 10c. to 15c. a pair.

Hosiery Trade Note

A prominent selling agent, basing his predictions of higher hosiery prices on advances in cotton and cotton yarns, when asked whether probable Government intervention would relieve the situation answered: "Anything affecting the South will not be interfered with—that's cotton."

MORE SWEATER INQUIRY

Colder Weather May Result in Renewed Buying of Heavy Lines

With the continuance of extreme cold weather all over the eastern part of the country, retail sales of heavy sweaters are large, and it is believed that this is the forerunner of a return of jobbers for more goods. However, most manufacturers are sold as far as they care to be, though it is likely that some of them could be induced to take business for near delivery. The bulk of business now on books is for late delivery, and sweater mills would probably be willing to take a limited amount of business to deliver before other contracts are filled.

Generally the market is without important change. Jobbers seem supplied as far ahead as they care to be, and naturally mills have a plenitude of business. Raw materials and yarns are no lower or no easier to buy, and manufacturers are unwilling to anticipate far away conditions, either in the purchase of supplies or booking of contracts.

Sweater Trade Notes

Sager Bros., of Syracuse, manufacturers of fancy knit goods, announce that the company will be dissolved on Feb. 1. The company has been in existence about 32 years.

The Barnes Knitting Co., this city, are hereafter to be sole selling agents of the "Hetherkote" line of sweaters manufactured by the Wye Knitting Mills, Winchendon, Mass.

The Jaason Knitting Mills have moved from 55 Wallace street to new offices at 581 Broadway.

S. Horowitz & Son, on Monday will open new offices at 97 Fifth avenue. The company manufactures infants' knit goods, and has been located at 43 East 20th street.

To Address Wholesalers

At the annual convention of the National Wholesale Dry Goods Association, to be held in the Waldorf-Astoria, this city, on Monday, Tuesday and Wednesday of next week, several prominent textile manufacturers are among the speakers. At Monday's session of the general body of the association, Franklin W. Hobbs, president of the Arlington Mills, Boston, will speak on "Commercial Preparedness for International Peace." The meeting of the Jobbers' Association of Knit Goods Buyers section of the organization will be addressed by P. C. Withers, president and general manager of the Illinois Knit Goods Co., Mt. Vernon, Ill., on "Helping America in Knit Goods." Tuesday's meeting of the Jobbers' Association of Dress Fabric Buyers will be addressed by J. R. MacColl, president of the Lorraine Manufacturing Co., Pawtucket, R. I., on the "Wool Situation." Edwin A. Fleisher, treasurer of S. B. & B. W. Fleisher, Inc., Philadelphia, will speak on "War Emergency Knitting Yarn Conditions" at Wednesday's meeting of the Jobbers' Association of Notion Buyers section.

READING, PA. The new hosiery mill of the D. S. & W. Hosiery Co., 1,120 Moss street, is rapidly nearing completion, and the company is rushing construction work. The new plant is estimated to cost $25,000.

FEW WOOL LINES QUIETLY OPENED

Marked Scarcity of Wool Underwear Mere Apparent as Season Advances—Customers Only Can Buy

Wool underwear for the fall season is coming into view but not in a manner that it can be generally seen on the market. Several lines have been opend within the past ten days or so, but such openings bear little resemblance to usual procedure. Only customers of long standing on the accounts of mills can buy, and their demands are being pared down to share an equal distribution of the goods that mills can give to civilian business. As the season advances the marked scarcity of wool lines is becoming more and more apparent, and the jobber whose former practise has been to divide his purchases generally in the market without cultivating any particular selling agent faces a serious problem so far as the covering of his wool goods requirements are concerned.

It is of little value to report on prices under existing conditions for manufacturers are establishing prices upon a basis corresponding to their individual positions, and with little regard to competition. There is a sincere endeavor on the part of manufacturers, however, to keep prices reasonably down, and it can be truthfully said that none are taking advantage of the situation; at least, this can be assumed from the lack of complaint among buyers. In a general way it can be said that new prices are ranging all the way from 75 to 100 per cent above levels of the same season a year ago. But prices are a secondary consideration to the ability to secure goods, and when any of the latter become available there is little likelihood of any fault being found with values.

A better idea of the amount of wool goods the Government will require during the year seems to have been imparted to manufacturers, but evidently the inherent trait of secrecy of officials has been forced upon manufacturers for none of the latter is willing to tell how much business he has booked. One large mill, however, is limiting the acceptance of wool business from civilians to just 10 per cent of what they took last year, and are giving the rest of their production to war purposes, and several other mills are known to be in as practically an acute situation so far as the taking of civilian business is concerned.

No relief has been felt in the wool or yarn markets as yet, and with the prices paid for Australian wools at the Boston auctions last week and the strong situation in the South American primary markets giving impetus to the maintenance of at least current high levels for both wools and yarns, no immediate relief is in sight. In view of this outlook, it is probable that manufacturers will continue to sell underwear strictly on a basis of owned raw materials.

COTTON LINES UNCHANGED

In the cotton end of the market there is no apparent change. Demand is brightening somewhat, but a majority of manufacturers have as much business on their books for the fall season as they care to take under existing conditions. It is felt that because of the acute scarcity of wool lines, jobbers will be more than ever eager to buy cotton lines and a marked stringency of the latter appears unavoidable. No relief from the troublesome labor situation is in view, shipping is not evidencing the hoped for improvement and cotton and yarn prices continue upward in trend. It is a situation that time only can work out, and many manufacturers have reached a decision to wait and let the future solve itself.

Underwear Trade Notes

A majority of selling agents are requesting that wool openings be left unannounced. This is to avoid requests from buyers whose demands cannot be met.

One large mill making such a request has 250 cases of flat wool shirts and drawers for the civilian trade and is proportioning the acceptance of customers' orders on a basis of one-tenth of their purchases of a year ago. This line has been opened at an advance from last year of about 75 per cent.

KNIT GOODS CONVENTION

Government Use of Exhibition Hall Not to Interfere with Exhibit

Secretary C. B. Carter of the National Association of Hosiery & Underwear Manufacturers has sent out a letter to the exhibitors at the Annual Exhibit held in connection with the annual convention of the Association in Philadelphia, to be held May 20 to 25, 1918. This letter states:

"The Quartermaster's Department of our Government came to us some weeks ago and asked permission—which was promptly granted—to use the exhibition hall of the Commercial Museum for temporary storage purposes. Should we find that the entire hall will be required for war emergency needs during the time of our customary occupancy, we of course will very cheerfully waive our right in the lease of the building for the time, and arrange for another hall best suited to our needs, of which, fortunately, there are several in Philadelphia.

"Suffice it to say our exhibition will be held 'as usual' on a larger scale than ever before."

The following is a partial list of those who will occupy space in the Knitting Arts Exhibition.

List of Exhibitors to Date

Aberfoyle Manufacturing Co.
Ainsile Knitting Machine Co.
Jacob K. Altemus.
American Laundry Machinery Co.
American Wool & Cotton Reporter.
Andreykovicz & Dunk.
Apex Chemical Co.
Atlantic Refining Co
Beattie Manufacturing Co.
Berks Engineering Co.
Richard A. Blythe, Inc.
Bicking Paper Press Co.
Boger & Crawford.
Charles Bond Co.
B. F. Boyer Co.
H. Brinton Co.
Cannon Mills.
Van Court Carwithen.
Clipper Belt Lacer Co.
Continental Latch Needle Co.
Cotton (W. R. C. Smith Publishing Co.).
Albert Ivins Croll.
Daily News Record.
Decalmo Machine Manufacturing Co.
George C. Decker.
Frank M. Deeny.
Franklin D'Olier & Co.
Eastman Machine Co.
Electro Bleaching Gas Co.
Electro Chemical Co.
Enterprise Mill Soap Works.
W. F. Fancourt & Company, Inc.
J. B. Ford Co.
Franklin Process Co.
Gastonia Cotton Yarn Co.
General Chemical Co.
Harding, Tilton & Co.
Hemphill Manufacturing Co.
John W. Hepworth & Co.
Hyde-Rakestraw Co.
H. A. James & Co.
Jenckes Knitting Machine Co.

The Knitting Arts Exhibition

AND

Fourteenth Annual Convention

OF THE

NATIONAL ASSOCIATION OF HOSIERY AND UNDERWEAR MANUFACTURERS

May 20 to 24, 1918

PHILADELPHIA, PA.

The Only Exhibition in the World Devoted Exclusively to Knit Goods and Related Industries

The ONE PLACE for Meeting More KNIT GOODS MANUFACTURERS in Five Days than could be Visited by a Corps of Salesmen in Months.

SHOW THEM WHAT YOU HAVE TO OFFER

in Machinery, Yarns, Mill Supplies, Accessories.

MAKE YOUR RESERVATION EARLY

C. B. CARTER, Secretary
425 Chestnut Street, Philadelphia, Pa.

W. H. & F. Jordan, Jr.
Kali Manufacturing Co.
Kaumagraph Co.
Keystone Fibre Co.
Klauder-Weldon Dyeing Machine Co.
The Knit Goods Bulletin.
W. T. Lane & Brother.
Leatherold Sales Co.
G. S. Lings & Co.
Lowell Yarn Co.
Manufacturers' Supplies Co.
Marlboro Cotton Mills.
McConnel & Co., Ltd.
Merrow Machine Co.
Winthrop H. Moore.
National Aniline & Chemical Co.
National Knit Goods Supplies Co.
National Marking Machine Co.
N. Y. Revolving Portable Elevator Co.
Paramount Hosiery Form Drying Co.
Paulson, Linkroum & Co.
Peech Sons & Phillips Co.
Permutit Co.
George B. Pflingst.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
T. J. Porter & Sons.
Posselt's Textile Journal.
C. M. Plowman & Co.
Rhode Island Processing Co
Roessler & Hasslacher Chemical Co.
Schaum & Uhlinger.
Scholler Brothers Co.
Scott & Williams, Inc.
J. L. Shoemaker & Co.
Smith, Drum & Co.
The Walter Snyder Co.
The Solvay Process Co.
Southern Textile Machinery Co.
E. O. Spindler.
Standard Processing Co.
Stanley Aniline Chemical Works.
Standard Machine Co.
Henry W. Taylor's Sons.
Textile World Journal.
Tolhurst Machine Co.
Uniform Dyeing Machine Co.
Union Special Machine Co.
U. S. Gutta Percha Paint Co.
Universal Cutter Co.
The Viscose Co.
Charles J. Webb & Co.
Willcox & Gibbs Sewing Machine Co.
Williamsburg Chemical Co.
Alfred Wolstenholme & Son, Inc.
Thomas Wolstenholme Sons & Co.
O. F. Zurn Company.
Walter Zeigler.

Distinguish War Workers

Employes of hosiery and underwear mills working on Government orders will hereafter wear a distinguishing button showing that they are "doing their bit," if the plans of J. P. Quinlan, knit goods selling agent of this city, come to a successful fruition. It is the latter's intention to have a button issued for workers employed on Government contracts that they can wear on their coat lapels, which more through its psychological effect than any other influence will form a patriotic alliance of textile workers that will go far toward the elimination of labor misunderstandings in mills whose product is for war purposes. Not only has the button been designed for the employes to wear, but the mill owner will also be asked to display it. The button is of burnished bronze, elliptical in shape, in the center of which is produced a miniature hosiery or underwear machine, according to the character of the wearer's work, while around the rim is engraved the phrase "Behind the Man Behind the Gun." At the top of the shield a miniature American flag is reproduced, and at bottom is the word textile. Plans for the distribution of this button have not been completed, but it is the intention of the proponent to have individual mill owners give them out to their employes. The Council of National Defense has been advised of the movement by Mr. Quinlan, and it is the latter's hope that a decision favoring its adoption will soon be rendered. A favorable opinion toward the movement has been expressed by the National Association of Hosiery & Underwear Manufacturers, and the co-operation of the various labor unions is to be asked.

COLUMBUS, O. The Nu Back Manufacturing Co. has filed notice of a change of name to the Sanitary Knit Fabric Co. Meyer Feldman acts as general manager of the company, which manufactures knit fur fabrics for auto robes and coats, and at last report had an equipment of 11 knitters and 2 sets of cards.

MAGIC LEATHER TREATMENT

¶ The main factor in long life to leather and canvas belting.

¶ MAGIC LEATHER TREATMENT is recognized as the most successful treatment for belts in the largest factories of the middle west.

¶ MAGIC LEATHER TREATMENT stops slippage on first application, unless over-loaded, and treats the belt so that its life is doubled and tripled.

¶ On account of the high cost of leather no factory can afford to be without MAGIC LEATHER TREATMENT.

¶ MAGIC LEATHER TREATMENT is absolutely a pure Neatsfoot Oil proposition.

THINK OF THIS

¶ Over two million dollars worth of power is lost every week through inefficient power transmission and slippage. MAGIC LEATHER TREATMENT OVERCOMES THIS.

¶ WE ARE PREPARED to submit sample on 60 days' trial—to be paid for after we conclusively prove that it is worth every cent we charged you for it.

WRITE NOW AND OVERCOME YOUR TROUBLES

MAGIC LEATHER TREATMENT CO.
59-65 Hale St., Detroit, Mich.
11 CENTRAL ST. BOSTON, MASS.

PROMPT SERVICE RIGHT PRICES

BONE DRY HOSIERY FINISHING BOARDS
THAT WORK ABSOLUTELY SMOOTH

JOS. T. PEARSON
1825 E. Boston Ave. Philadelphia, Pa.

WATCH FOR THEM
FISHER POWER PLANT SPECIALTIES
TO BE ANNOUNCED IN THIS *JOURNAL*
FISHER GOVERNOR CO.
Marshalltown Iowa

MILL NEWS—Continued

(*Continued from page* 449)

tion, equipped with the electric drive. The product will be sold direct.

*PATERSON, N. J. Geo. N. Berlet, who has been connected with the raw material end of the silk business for over fifteen years, makes the announcement that he has formed the Berlet Silk Yarn Co., Inc. The new company will have its headquarters in the United Bank Building, 152 Market street, and have its New York office at 331 Fourth avenue. Mr. Berlet will be president and treasurer and will devote his entire time and attention to the management of the business.

*WESTERLY, PA. The equipment of the new branch of the MacGowan Silk Co., commission warping and weaving, is 10 looms running in three eight-hour shifts, 5 warping machines, and 5 winding machines.

HYDE PARK, MASS. C. Stohn has under way improvements which will increase his equipment about 40 per cent. This includes looms, preparatory machinery and some finishing machinery.

WOBURN, MASS. The Byer Manufacturing Co., manufacturers of silks, with a factory on Kneeland street, Boston, have leased the Knight Building at 431 Main street and will move their plant to the new location Jan. 15.

PATERSON, N. J. The Goldy Ribbon Co., located on Water street, are reported as considering the installation of a finishing plant for their product.

PATERSON, N. J. The Shapiro, Resnick & Co. concern are reported as about to move to the buildings of the Passaic Steel Co. on Straight street, and they are also reported as having purchased another silk plant, entire, which will be combined with their own mill.

PATERSON, N. J. Westerhoff Bros. have moved their Paterson broad silk plant from the Harding Mill, Van Houten street, to the Hermann Mill, at 173 Broadway, and have added more looms. They have been engaged in the manufacture of silk neck kerchiefs for the Government for several years.

WEST NEW YORK, N. J. Stohn Bros., 687 Harrison place, are adding machinery which will double their plant. Some looms have already arrived and the balance of looms are on order.

HAWLEY, PA. The Welwood Silk Mill has had plans prepared for the construction of a new two-story brick addition to its plant on Erie street, to cost $8,000. J. J. Hawley, Traders' Bank Building, Scranton, Pa., is architect.

HOBOKEN, N. J. The branch of the Allentown Silk Co., formerly located in the Rosenheim Mill, Paterson, N. J., is moving to 618 Clinton avenue, Hoboken. There were 24 looms in this plant, manufacturing ribbons.

Miscellaneous

INDIAN ORCHARD, MASS. The Fiberloid Co. is planning an addition to its plant and will start construction work with the opening of warm weather. The company manufactures sheeting, waterproof collars and novelties.

*TORONTO, ONT., CANADA. The Canadian Dyers Association, Ltd., has increased its plant 100 per cent and has added a considerable number of dyeing machines, as well as finishing equipment to go with same. They have also made extensive additions to the old plant, the whole amounting to about $40,000. They have developed some forty odd shades for the dress goods trade, all having been obtained with American aniline colors.

*HOUSTON, TEX. Texas Textile Co. has plans and specifications for its building and will open construction bids during the present week. It intends to provide a one-story 200 x 60 ft. reinforced concrete and hollow-tile structure. Frederick Wide, manager of the enterprise, is endeavoring to complete the arrangements for the equipment of machinery. This installation (as heretofore mentioned in connection with the company's organization and plans) is intended to provide for a daily capacity of 2,000 pounds of absorbent cotton and 1,000 pounds of artificial silk. The Texas Textile Co. is capitalized at $250,000 and it is understood that the English Government is interested with a view of using the new mills product for medical and surgical purposes in the great war.

*HOUSTON, TEXAS. The Texas Waste Mills, located in a building at Rusk and St. Emanuel streets, cotton and woolen wiping and packing waste, are capitalized at $100,000, with the following officers: H. A. Varner, president; F. M. Varner, treasurer; L. E. Stenger, buyer, and D. Wooten, superintendent. The plant, which is operated by electricity, uses cotton, woolen, flax and jute mill sweepings, lace curtains, linsey carpets, cloth ends and rags.

PHILADELPHIA, PA. Fire occurred on New Year's Day at the Germania Dye Works, Kensington avenue above Allegheny avenue. One building and a large quantity of yarn were burned, entailing an estimated loss of $20,000.

PATERSON, N. J. Adolph Blondell, Inc., has filed incorporations papers to engage in the manufacture of silk, wool and other textile fabrics. The capital is $125,000. Adolph Blondell, Gerard Eggermont and Cyrille Nollet, all of Paterson, are the incorporators.

UNION HILL, N. J. The Union Hill Silk Finishing & Dyeing Co., with an authorized capital of $125,000, has been incorporated. Eugene Burckhardt, of New York, Albert E. Emerson and Adolph Blundell, of Paterson, are named as the incorporators. The new concern will carry on a general silk dyeing and finishing business.

NEW YORK, N. Y. The Columbia Finishing Co., textiles has been incorporated, the capital being $3,000. Clough P. Overton and Albert S. Mortimer, of New York; Percy Gulline, of Lowell, Mass., are named as the incorporators.

SAGINAW, MICH. For the duration of the war the Nitro Products Co. will discontinue making artificial silk yarns as the full capacity of the plant is being used for other nitro products for Government use.

YALE, MICH. The James Livingston Flax Co., Ltd., has been sold to the Amerlin Co., of which B. F. Miles, 2712 Overlook road, Cleveland, Ohio, is president. The latter company was incorporated last summer with a capital of $5,000,000. At the Yale plant the growing, scutching and hackling of flax is done.

SAYLESVILLE, R. I. The Crefeld Waste & Batting Co., it is stated, has amended its charter and decreased its capital from $300,000 to $200,000.

** Indicates previous mention of project.*

NEEDLES

Because

This department's demands are far in excess of our supply, we solicit your surplus.

Send samples, state quantity and price to NEEDLE DEPARTMENT.

GUSTAVE A. RUMPF
205 Chestnut Street
Philadelphia, Pa.

Twenty Years Manufacturing Cloth Boards
THE CHAFFEE PATENT CLOTH BOARD
They Save Their Cost in Freight Clean, LIGHT and Strong
Made of Paper and Wood
Need no covers
Will not Split or Warp; not liable to break

BOX SHOOKS and CLOTH BOARDS
M'f'd by CHAFFEE BROTHERS CO., Oxford, Mass.

THAT NEW DETERGENT FOR FINISHING ALL COTTON AND WOOLEN GOODS
Soapalite
A Mineral Soap—Not a Soda
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Sole Manufacturers
THE ELECTRIC SMELTING & ALUMINUM CO. LOCKPORT, N. Y.

GARFIELD MACHINE WORKS
TEXTILE MILL SUPPLIES
SPECIAL TOOLS MACHINERY MACHINE PARTS
SCREW MACHINE PRODUCTS GEARS METRIC SYSTEM WORK
Office and Works: GARFIELD, N. J.

B & C TRADE MARK
BARBER-COLMAN COMPANY
BOSTON MASS. MAIN OFFICE AND FACTORY ROCKFORD ILL. GREENVILLE S. C.
HAND KNOTTERS AND WARP TYING MACHINES

THE DIXON PATENT ADJUSTABLE LEVER
Changes weight without stopping frames. Gives uniform weight, essential to best results. Half turn of screw adjusts it. All patterns for all makes of frames.

Send for Samples to DIXON LUBRICATING SADDLE CO., Bristol, R. I.

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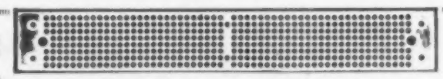
Highest Grade Best Value
Mills Rainbow, Conn.

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For All Purposes
Inquiries Solicited
Address Hartford, Conn.
JACQUARD CARDS
THE MERWIN PAPER CO.

Fine Fully Combed Yarns

Flint Manufacturing Co.
Groves Mills, Inc.
Arlington Cotton Mills

Spinners of fine combed peeler and combed Sea Island Yarns. Mill deals direct with consumer. *Write for prices today.*
GASTONIA, N. C

Representative: Wm. S. Waterman
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Representative: E. G. Harper
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HAMBURGER COTTON MILLS

COLUMBUS - GEORGIA

STOCK DYED SULPHUR COLORS
Olive Drab
Khaki
Black

CONES, TUBES, WARPS
For Knitting and Weaving

Sell Direct and Through Agents—Single and 2-Ply Yarns, 6's-20's

DIRECT TO CONSUMER Cotton Yarns of all Descriptions
Johnston Manufacturing Co.
C. W. JOHNSTON, President, Charlotte, N. C.
R. W. STOKES, Manager, 308 Chestnut Street, Philadelphia, Pa.
Highland Park Mfg. Co., Mills 1, 2 and 3; Anchor Mills; Johnston Mfg. Co.; Brown Mfg. Co.; Jewel Cotton Mills; Norcott Mills Co.; Roberta Mfg. Co.; Belton Yarn Mills

T. E. HATCH
COTTON YARNS
ALL COUNTS AND VARIETIES
77 Franklin Street Boston, Mass. 949 Broadway, New York

Deal Direct With the Mill
COLUMBUS, GA.
SWIFT SPINNING MILLS
MUSCOGEE MFG. CO.
White and Colors
High Grade WEAVING and KNITTING YARNS
Represented by
VAN COURT CARWITHEN
300 Chestnut Street, Phila.

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McColl, S. C.
Manufacturers of
COTTON YARNS
of all Descriptions
E. D. TANNAHILL, Sales Manager
350 Broadway, NEW YORK
PHILADELPHIA BOSTON CHICAGO UTICA

LOWELL YARN CO.
313 Mariner & Merchants Bldg. PHILADELPHIA, PA.
Lowell Cotton Mills No. 1
Avon Mills, Gastonia, N. C.
Dorothy Mfg. Co.
DIRECT SELLING AGENTS
Peerless Mfg. Co.
Ozark Mills, Gastonia, N. C.
Lowell Cotton Mills No. 2
S. M. ROBERSON, Pres. JOHN C. RANKIN, 1st Vice-Pres. W. C. WILKINSON, 2nd Vice-Pres. JNO. R. ROSS, Sec. & Treas.
SPINNING 36's to 80's Combed Peeler — 36 to 60's Carded Peeler single and ply, any Twist — Cones, Skeins, Warps and Tubes.

ALBERT RAU & CO.,
Carded or Combed **COTTON YARNS**
52 LEONARD ST., NEW YORK

The John F. Trainor Co.
291 Broadway, New York
American, Egyptian and Sea Island Yarns
Both Natural and Mercerized

T. J. PORTER & SONS
Direct Representatives of large Spinners of all classes of
Cotton, Woolen, Worsted, Mohair and Linen Yarns and Threads
119 South Fourth Street, Philadelphia

YARN MARKETS—

QUOTATIONS

The following quotations have been compiled in Boston

COTTON YARNS.

CONES.

EASTERN PEELERS.

	Carded.	Combed.
8s	52 — 53	64 — 65
10s	52 — 54	64 — 66
14s	53 — 54	65 — 66
16s	54 — 55	66 — 67
20s	56 — 58	68 — 70
22s	58 — 60	70 — 72
24s	59 — 61	72 — 74
26s	60 — 62	74 — 76
30s	62 — 64	76 — 78
32s	64 — 66	78 — 80
34s	66 — 68	80 — 82
36s	70 — 72	82 — 84
40s	74 — 76	

SKEINS.

	Carded.	Combed.
2-12s	58 — 60	66 — 68
2-14s	59 — 61	67 — 69
2-16s	60 — 62	68 — 70
2-18s	61 — 63	69 — 71
2-20s	62 — 64	70 — 72
2-22s	63 — 65	72 — 74
2-24s	64 — 66	74 — 76
2-26s	65 — 67	76 — 78
2-28s	66 — 68	78 — 80
2-30s	68 — 70	80 — 82
2-36s	72 — 74	86 — 88
2-38s	74 — 76	88 — 90
2-40s	78 — 80	90 — 95
2-50s		1 00 — 1 10
2-60s		1 15 — 1 25
2-70s		1 30 — 1 40
2-80s		1 40 — 1 50

WARPS.

	Carded.	Combed.	Reverse twist.
2-20s	69 —71	81 —83	90 —95
2-36s	73 —75	89 —91	95 —1 00
2-40s	79 —81	90 —95	1 05—1 15
2-50s		1 05—1 10	1 15—1 25
2-60s		1 20—1 25	1 25—1 35
2-70s		1 35—1 40	1 40—1 50
2-80s		1 45—1 50	1 50—1 60

EASTERN EGYPTIANS.

SINGLE SKEINS (COMBED).

30s	Nominal	55s	Nominal
35s	Nominal	60s	Nominal
40s	Nominal	70s	Nominal
45s	Nominal	80s	Nominal
50s	Nominal	90s	Nominal

TWO AND THREE-PLY SKEINS (COMBED).

30s	Nominal	65s	Nominal
35s	Nominal	70s	Nominal
40s	Nominal	75s	Nominal
45s	Nominal	80s	Nominal
50s	Nominal	90s	Nominal
60s	Nominal		

TWO-PLY WARPS (COMBED).

2-30s	Nominal	2-50s	Nominal
2-35s	Nominal	2-60s	Nominal
2-40s	Nominal	2-70s	Nominal
2-45s	Nominal	2-80s	Nominal

COPS.

	Carded.	Combed.
6s & 8s	Nominal	Nominal
10s & 12s	Nominal	Nominal
14s	Nominal	Nominal
15s & 16s	Nominal	Nominal
18s & 20s	Nominal	Nominal
20s	Nominal	Nominal
24s	Nominal	Nominal
26s	Nominal	Nominal

COMBED SEA ISLAND.

	Single.	Two-ply.	Reverse twist thread-yarn.
12s	Nominal	Nominal	Nominal
14s	Nominal	Nominal	Nominal
16s	Nominal	Nominal	Nominal
18s	Nominal	Nominal	Nominal
20s	Nominal	Nominal	Nominal
22s	Nominal	Nominal	Nominal
25s	Nominal	Nominal	Nominal
30s	Nominal	Nominal	Nominal
40s	Nominal	Nominal	Nominal
50s	Nominal	Nominal	Nominal
60s	Nominal	Nominal	Nominal
70s	Nominal	Nominal	Nominal
80s	Nominal	Nominal	Nominal
90s	Nominal	Nominal	Nominal
100s	Nominal	Nominal	Nominal

The following quotations have been compiled in Philadelphia, New York and Providence.

SOUTHERN YARNS.

SINGLE SKEINS—WARP TWIST.

6s & 8s	50 —51	20s	— —55
10s	— —53	24s	— —56
12s	— —54	26s	— —57
14s	— —54	30s	— —58
16s	— —55	40s	— —72

TWO-PLY SKEIN.

2-8s	— —51	2-24s	56 —57
2-10s	— —53	2-26s	57 —58
2-12s	— —54	2-30s	58 —59
2-14s	— —54	2-36s	— —68
2-16s	— —54	2-40s	72 —75
2-20s	— —54	2-50s	— —96

SINGLE WARPS.

10s	— —53	24s	— —57
12s	— —53½	26s	— —57
14s	— —54	30s	59 —60
16s	— —55	40s	— —73
20s	— —56		

TWO-PLY WARPS AND TUBES

2-8s	— —52	2-24s	56 —57
2-10s	— —53	2-26s	57 —58
2-12s	— —54	2-30s	58 —60
2-14s	— —54	2-40s	73 —75
2-16s	— —55	2-50s	95 —98
2-20s	— —56		

3-46s and 4-ply skeins and tubes, 45c. (dark); (white) 51c.; 2-10s and 2-12s slack 53.

CONE (FRAME SPUN).

6s	— —50	20s	— —55½
8s	— —50	22s	— —56
10s	50 —51	24s Extra	— —57½
12s	50½—51	26s Extra	— —60
14s	52 —53	30s	— —62
16s	53 —54	30s d card	66 —67
18s	54 —55	40s	— —70

BLACK AND WHITE D. & T. SKEINS.
(ALL PRICES NOMINAL.)
(Carded.)

2-20s	.. —..	2-30s	.. —..
2-26s	.. —..	2-40s	.. —..

STAPLE COMBINATIONS.

2-20	.. —..	20-44s	.. —..
10-30s	.. —..	20-60s	.. —..
14-30s	.. —..	16-30s	.. —..
16-30s	.. —..	16-120s	.. —..

BLENDED.

2-16s	.. —..	2-26s	.. —..
2-20s	.. —..	2-30s	.. —..
2-24s	.. —..	2-40s	.. —..

EASTERN PEELERS AND EGYPTIANS
(Cones or Tubes.)

Combed Peeler.		Combed Egyptian.
2-20s	73 —75	2-20s Nominal
2-24s	76 —77	2-24s Nominal
2-28s	78 —80	2-28s Nominal
2-30s	79 —84	2-30s Nominal
2-34s	83 —85	2-34s Nominal
2-36s	75 —87	2-36s Nominal
2-38s	88 —90	2-38s Nominal
2-40s	92 —95	2-40s Nominal
2-50s	1 00—1 02	2-50s Nominal
2-60s	1 15—1 17	2-60s Nominal
2-70s	1 30—1 32	2-70s Nominal
2-80s	1 50—1 52	2-80s Nominal

CARDED PEELER CONES.

10s	— —53	24s	— —58
12s	— —53½	26s	— —60
14s	— —54	28s	— —61
16s	— —54½	30s	— —63
18s	— —55	32s	— —66
20s	— —56	36s	— —69
22s	— —57	40s	— —73

CARDED PEELER, SHUTTLE COPS.

8s	— —51	26s	— —56
10s	— —51½	28s	— —56½
12s	— —52	30s	— —57
14s	— —52½	32s	— —57½
16s	— —53	34s	— —58
18s	— —53½	36s	— —58½
20s	— —54½	38s	— —59
22s	— —55	40s	— —60

SOUTHERN COMBED SEA ISLAND.

WARPS AND SKEINS.

2-20s	Nominal	2-50s	Nominal
2-30s	Nominal	2-60s	Nominal
2-36s	Nominal	2-70s	Nominal
2-40s	Nominal	2-80s	Nominal

SOUTHERN COMBED PEELER.

WARPS, SKEINS AND CONES.

2-30s	77 —78	2-60s	1 10—1 15
2-36s	82 —85	2-70s	1 27—1 30
2-40s	86 —90	2-80s	1 40—1 45
2-50s	1 00—		

SINGLES.

12s	64 —65	30s	77 —78
14s	65 —66	36s	82 —85
16s	66 —67	40s	88 —90
18s	67 —68	50s	— —1 00
20s	68 —69	60s	1 10—1 15
24s	69 —70	70s	1 25—1 30
26s	71 —72	80s	1 45—1 50

MERCERIZED COMBED PEELER.

CONES—(UNGASSED)

Southern Yarns.		Eastern Yarns.	
2-20s	90 —92	2-20s	97 —1 00
2-30s	97 —1 00	2-30s	1 02—1 05
2-36s	1 02—1 04	2-36s	1 06—1 09
2-40s	1 05—1 06	2-40s	1 09—1 15
2-44s	1 06—1 10	2-44s	1 16—1 18
2-50s	1 22—1 27	2-50s	1 26—1 30
2-60s	1 32—1 33	2-60s	1 36—1 42
2-70s	1 49—1 50	2-70s	1 52—1 56
2-80s	1 70—1 75	2-80s	1 80—1 85

Extra cost for gassing approximates: 30s and below, 4c.; 30s to 40s, 4c.; 40s to 50s, 5c.; 50s to 60s, 6c.; 60s to 70s, 7c.; 70s to 80s, 8c.; 80s to 100s, 11c.

Less cost for skeins: 20s and below, 3c.; 20s to 30s, 4c.; 30s to 40s, 4½c.; 40s to 50s, 5c.; 50s to 60s, 6c.; 60s to 70s, 7c.; 70s to 80s, 8c.; 80s to 100s, 10c.

QUOTATIONS & REPORT

COTTON YARNS HIGHER; TRADE ABOUT FAIR

Government Requirements Support the Market — Southern Spinners Stand Firm on Price Advances

It is stated with emphasis that southern mills demand and are getting 60 cents for 2-30s warps on the ground at the mill door, and that other nearby counts are held at prices based on that figure. That's how strong the yarn market is and how stubbornly southern mills are holding for their price. The natural presumption is that such radical advances would check buyers in their preliminary move toward securing supplies. In an individual way it may have but in a general way sellers report business all that can be expected at this time.

STRONG GOVERNMENT SUPPORT

There is no getting away from the fact that Government requirements have been the mainstay of the cotton yarn market, and that the continuance of Government demand is relied on to maintain and, beyond doubt, to augment its present strength, in the generally expressed opinion of members of the trade. Government consumption while it has operated to curtail the production of civilian goods in many directions, eliminating more than a few market specialties, has expanded production in other directions and kept mills on a double shift. All this has enlarged the total yardage and increased the consumption of yarns used in a like ratio. The present cotton market, the additional needs of the Government, and the fact that individual mills are reported engaged for a year to come seems to give the seller control of the situation.

NOT SO RADICAL

No class or count of southern yarn appears to be exempted in the general advance of prices, and some changes which look radical are said to be compulsory. Buyers admit that the market is necessarily firm on the strength of Government requirements, but if that should be curtailed or rather cut off the market would collapse like a wind-wrecked tent. And the sellers agree, no doubt it would, but something mighty and compensating must happen meanwhile. Knitting yarns are comparatively quiet but firm. No very active trading in knitting yarns had been looked for during the first half of the present month.

CARELESS TRANSPORTATION

Transportation companies are coming in for a great deal of adverse criticism for a state of affairs that dates back before the Government took control. Shipments are turning up that have been apparently lost with little or no effort made to locate them. One large yarn shipper was notified on Wednesday of a case of lost yarn that had been lying on a steamship pier, out in the open, for six weeks, frozen fast in six inches of ice to the planking. Tracer had been sent after that lost lot for two months without a word of report. One instance in many similar complaints.

FUTURE POSSIBILITIES

A sale of 100,000 pounds of 2-13s reported at 55c. demonstrates the market and evidences a demand for in between count yarns. The concise remark that "the demand is greater than we can supply" summed up the situation in one of the largest yarn departments in town. Asked to talk further it was said that the Government was expected to increase its market demands shortly. That transportation would probably interfere for the next sixty days. That yarns sold for May delivery and based on present quotations of cotton for May would and should go higher.

N. Y. Cotton Yarn Trade Notes

A. J. Bellenoit, formerly connected with the New York office of the New England Cotton Yarn Co., has accepted a position with Chas. J. Webb & Co., cotton yarn department. He will assist U. Grant Long in covering New York and the adjacent territory.

In connection with transportation difficulties, one local house states they have a shipment which has been on the road since Oct. 15 from North Carolina; since then they have received shipments made Oct. 26 and Nov. 11.

Owing to fuel conditions, one southern mill reports that in the past six weeks they have only been able to operate one consecutive week; the rest of the time has been for a period of a few days at a time.

LIMITED ACTIVITY

Cotton Yarns Bring High Prices for Spot Delivery

PHILADELPHIA, Jan. 8.—The local cotton yarn market is still rather quiet following the holiday period. Dealers state inquiry to-day is chiefly for quick delivery as many manufacturers are not getting the necessary deliveries against their contracts and they are anxious to fill in. The shipping conditions are still in a most unsatisfactory state, so that dealers are never able to know when they will receive yarns, or be able to make deliveries because of embargoes and freight congestion. One house stated one of their mills had accumulated about 200,000 pounds of yarn which they had not been able to ship, with the exception of one lot of 25,000 pounds for a Government order. In fact the situation is such that dealers state they are not favorably disposed to very much civilian business, because of the difficulty in making these shipments and prefer Government business because that is supposed to receive prior attention, although even here it falls down frequently.

This uncertainty about deliveries has resulted in a scouring of the market for spot lots; when the yarn is to be had, there seems to be no limit to price. Naturally the market is all out of proportion, and prices have little real significance. However, with the cotton market still marching upward, spinners respond readily enough with advanced quotations. However, unless it is for spot shipment, there is a wide range between spinners' ideas and those of the buyers. The demand for spot shipment has of course greatly depleted local stocks on hand, and even those houses which usually can be depended upon for stocks, have little or nothing to offer as they have been well cleaned out. In fact many dealers say there never was a time when stocks were so low in this market.

WEAVERS' BUYING SCATTERED

Weavers are showing only scattered interest in yarns unless for Government

AMERICAN SILK SPINNING CO.
SPINNERS AND DYERS SPUN SILK YARNS
For Weaving, Knitting, etc. Cops, Cones, Tubes, Skeins, etc. Also SILK NOILS
ADMIRAL AND WHIPPLE STS. PROVIDENCE, R. I.

Paulson, Linkroum & Co., Inc.
COTTON YARNS
87-89 Leonard St. New York
PHILADELPHIA CHICAGO

TILLINGHAST-STILES CO. Cotton and Worsted Yarns
JESSE P. EDDY, Treas. PROVIDENCE, R. I.
HERX & EDDY Cotton Yarns and Warps
Incorporated
113 WORTH ST., NEW YORK 441 BOURSE BUILDING, PHILADELPHIA

JAMES E. MITCHELL COMPANY
COMMISSION MERCHANTS
COTTON YARNS FOR ALL PURPOSES
185 Summer Street Brown Building BOSTON, MASS.
122-124 Chestnut Street, PHILADELPHIA, PA.

HYDE-RAKESTRAW COMPANY
PHILADELPHIA
COTTON YARNS FOR KNITTING AND WEAVING

JOHN F. STREET & CO.
COTTON YARNS
12 So. Water Street PROVIDENCE, R. I.
CHICAGO PHILADELPHIA NEW YORK

STANDARD PROCESSING COMPANY
MERCERIZED YARNS
GASSED YARNS A SPECIALTY
Factory, Chattanooga, Tenn.
Sales Agents:
A. G. THATCHER W. H. THATCHER
Office, 720 Lafayette Building
PHILADELPHIA, PA.

ORSWELL MILLS
Fitchburg, Mass.
COTTON YARNS
All Qualities

J. B. JAMIESON
COTTON YARNS of all descriptions
77 Summer Street, Boston
Correspondence Solicited

COTTON YARNS FOR IMMEDIATE DELIVERY ONLY
WRITE FOR STOCK LIST
GEO. B. PFINGST
519 BOURSE BLDG., PHILA.

EWING-THOMAS CONVERTING CO.
Specialists in Mercerized Yarns CHESTER, PA.
Made from High Grade Peeler, Egyptian and Sea Island Cotton Warp Processed on Cones, Tubes and in Skeins Gassed, Bleached and All Colors.
MERCERIZING AND WINDING FOR THE TRADE
SPLICING YARNS ARTIFICIAL SILKS

H. S. RICH & CO.
COTTON YARNS
160-162 SOUTH WATER ST
PROVIDENCE, R. I.

MERCERIZING
DYEING and BLEACHING SKEIN YARNS
WINDING CONES TUBES COPS
GERALD COOPER
POMFRET ST. PROVIDENCE, R. I.

Our SELLING POLICY is based on ASSISTANCE, not Insistence

KNITTING

WINTHROP H. MOORE
Representing Spinners
HIGH GRADE COTTON YARNS
Selling Direct
ALBANY, NEW YORK

WEAVING

Associate Member National Association Hosiery and Underwear Manufacturers

WILLIAM WHITMAN COMPANY, INC.

YARNS

For Weaving, Knitting, Threads and Specialties

BOSTON NEW YORK PHILADELPHIA CHICAGO

Wm. H. Lorimer's Sons Co.

MANUFACTURERS OF

MERCERIZED YARNS

For all Purposes

MERCERIZERS AND DYERS

Ontario and Lawrence Streets
PHILADELPHIA, PA.

B&C

BOGER AND CRAWFORD
Main Office and Factory
E. ONTARIO, JANNEY, WEIKEL & TULIP STS., PHILA., PA.
New York Office: 20 W. 22d St.
MANUFACTURERS AND DEALERS
MERCERIZED YARNS
Plain and Colors
Mercerizing — Bleaching — Gassing — Coning and Tubing for trade

PROVIDENCE DYE WORKS
PROVIDENCE, R.I.
Dyers of Cotton Yarns in Skeins
Specializing in OLIVE DRAB SHADES for GOVERNMENT WORK and Sulphur Black
YARNS WOUND ON CONES AND TUBES.

GATE CITY COTTON MILLS
Manufacturers of Superior Quality
RING SPUN **HOSIERY YARN** MULE SPUN
We sell direct to Knitters and guarantee satisfaction
1202 Candler Building, ATLANTA, GA.

Spinners' Agents—Direct to Consumers
CLARENCE E. MASON CO.
Cotton Yarns Knitting and Weaving
PHILADELPHIA, PA.

O. S. HAWES & BRO.
FALL RIVER, MASS.
COTTON YARNS ALL FORMS AND NUMBERS

SOLWAY DYEING & TEXTILE CO.
PAWTUCKET, R. I.
Dyers, Bleachers and Mercerizers of Cotton Yarns, Warps or Skeins
ABSOLUTELY FAST COLORS

MONUMENT MILLS, Housatonic, Mass.
HIGH GRADE COTTON YARNS, White, Colors, Bleached
On Beams, Jack Spools, Cones, Skeins, and Chain Warps
FAST-BLACKS & COLORS { For Woolen Mills a specialty } WE SELL DIRECT

GLOBE DYE WORKS CO., Successors to R. Greenwood & Bault
Dyers, Bleachers and Mercerizers of Cotton Warps and Skein Yarns
Also DEALERS in MERCERIZED YARNS
140 Chestnut Street, PHILADELPHIA
Globe Bleach and Dye Works, Kinsey and Worth Sts., Frankford, Pa.

THE J. R. MONTGOMERY CO., WINDSOR LOCKS, CONN.
Manufacturers of
MERCERIZED COTTON YARNS Give the high Silk-like luster
In Knit Goods an Woven Fabrics
NOVELTY YARNS Boucle, Bourette and Spirals in Cotton, Wool, Worsted, Mohair and Silk
COTTON WARPS On Beams, Jacks, Spools and Tubes In Fancy Twist, Colors and Printed

Amherst Manufacturing Co.
Amherst, Mass.
Dyers, Bleachers and Mercerizers of Cotton Yarns in skein winding on cones

SEA ISLAND COTTON
Strong Stapled, Heavy Bodied, Carefully Selected for Spinners' Requirements
GORDON & COMPANY, Inc., SAVANNAH, GEORGIA
(Established 1856)

RHODE ISLAND PROCESSING CO. INC
converters of
Cotton Yarns - Mercerizing - Dyeing Bleaching and Winding
Mills at Coventry, R.I. Samples Submitted on Request

U. S. GLAZED YARN CO. PAWTUCKET, RHODE ISLAND
GLAZERS OF COTTON YARNS
We specialize in glazing fine single and ply yarns, and can give a lustre that will equal imported glazed. Prompt service and satisfactory work guaranteed.

COTTON WARPS
DANA WARP MILLS Westbrook, Maine
Cotton Yarn and Warps, Carded and Combed
WHITE and COLORED SINGLE and PLY SELL DIRECT

American Water Filters

Are SCIENTIFICALLY designed to meet the exacting conditions of all TEXTILE requirements.

We also install WATER SOFTENERS of any capacity to purify water for every TEXTILE purpose, including the prevention of scale in boilers.

American Water Softener Co.
1003 Chestnut St., Philadelphia, Pa.
"A Laborer can Operate the American"

A TAPE BELT FOR UNIVERSAL WINDERS

We have perfected a cotton tape belt for driving Universal Winders. Also one for Camless Winders. We urge all users of these machines to write us for samples. We offer this with our full indorsement, because exhaustive tests have satisfied us of its real merit.

BARBER MFG. CO. LOWELL MASS.
Spinning Tape Specialists

ASHDALE BLEACHERY
3213 Frankford Avenue 3212 Amber Street
PHILADELPHIA
BLEACHERS OF HOSIERY AND YARNS
Specialists in Peroxide of Lime Bleaches
Specialty soft work. Satisfaction guaranteed.

United States Conditioning & Testing Co.
340 Hudson Street 220 Ellison Street
New York, N. Y. Paterson, N. J.
Cotton, Wool and Silk Conditioning, Fabric Testing and Chemical Analyses

Elliot Cloth Folder and Measurer
FOR PRINT WORKS, GINGHAM AND COTTON MILLS, BLEACHERIES, ETC., ETC.
Send for circular. Manufactured by
ELLIOT & HALL, 54½ Harmon St., Worcester, Mass.

Hopkinson Dyeing and Textile Works
MERCERIZERS
Dyers and Bleachers of Skein Yarns. Twines and all Narrow Fabrics. Printers' Knotted Cords a specialty, on tubes or balls (our Fast Black will please you).
T. HOPKINSON, Prop. and Mgr. C. W. HOPKINSON, Supt.
Office and Works, 259 Forest St., Fall River, Mass.

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CROSBY & GREGORY
HEARD, SMITH & TENNANT
PATENTS
Old South Building BOSTON
PATENTS AND PATENT CAUSES TRADE MARKS COPYRIGHTS
Special Attention To Textile Inventions

Reels for Cotton WOOLEN AND WORSTED
Patented Hosiery Winders, Cop Winders and Spoolers
LINDSAY, HYDE & CO.
2124 to 2130 E. York St., Philadelphia, Pa.

ESTABLISHED 1844
BENJ. BUCKLEY'S SON
(WM. J. BUCKLEY) Gun Mill, PATERSON, N.J.
Manufacturer of all kinds of Spindles, Flyers, Rings, Tubes, Caps, etc., for Cotton, Silk, Flax, Woolen and Worsted Machinery.
Roving Spindles and Flyers a Specialty. Light Forgings.
REPAIRING OF ALL KINDS

Yarn Markets—Cont'd

goods. In fact, as previously stated, civilian business is rather on the decline because of unfavorable shipping conditions. There is said to be rather a good demand for coarse warps chiefly for ordnance materials for the Government. However, these yarns are reported scarce, and prices are very firm. On 2-12s warps, white stock sold at 56½c., with poorer grade at 54½ and 55c; 3-8s tubes waste stock sold at 50c. for a spot lot, with future business taken at 47c.; there is not much of this yarn being made now it is stated, for most of these mills are said to be on white yarn, as the insulation trade is about the only buyer with carpets so dull. A sale of 2-20s warps for future delivery was made at 56c., with skeins at from 54½ to 56c.; 2-30s sold at 59c. for future delivery, while another sale is reported at 60c. for April delivery, and a large order reported down East at 61c. Spinners ask around 62c. A sale of 2-16s skeins was made at 54½c., with tubes sold at 55c.; 2-26s skeins sold at 57c. and 2-36s at 69c.

KNITTERS ONLY FILL IN

Only scattered business is reported from knitting mills. These mills are said to be well engaged, but they are only showing interest where it is necessary to fill in. On 10s frame spun 52 to 52½c. is generally reported on sales, with 18s sold at 56c.; 20s at 57c.; 24s New York state grade sold at 58½c.; 28s sold at 60c. for an ordinary Pennsylvania grade, with a sale of 26s at 61c. A sale of 10s southern mule spun out of stock was made at 64c. There is a decided firmness shown by spinners in these yarns, but buyers are not yet willing to meet their ideas except possibly to get a spot lot when it is badly needed; then it is impossible to say what the price is.

COMBED YARNS QUIET

Combed yarns are not overly active. Dealers state the yarns are largely used in civilian lines, and therefore there is not so much chance for further business. Several southern mills are said to be writing to dealers offering spot shipments of stock yarns on hand indicating an accumulation at the mills. Others say they look for rather dull business in combed yarns because of thin predominance in civilian work. In single yarns especially is this the case, while only special lines seem to be using much in the way of ply yarns. Among these should be included the yarns for aeroplane cloth. Here dealers say several mills are using 2-60s in both mercerizing twist and in 28 turns, at around $1.15, with a 30s single warp twist combed peeler filling, and even a single 30s carded in a few instances. Prices are holding firmly, however, with cotton showing such strength. A sale of 18s single is reported at 67c. net weight; 34s eastern combed peeler sold at 80c., with 24s at 70c.; 40s single at 88c. In two ply 40s are held at 90 to 92c., with a sale at 86c.; 50s hold around $1.00 and even $1.05; many spinners ask $1.15 for 2-60s, but sales are reported at $1.10 and offerings at $1.08; 2-80s sold at $1.40.

Phila. Cotton Yarn Trade Notes

The Philadelphia office of the Newnan (Ga.) Cotton Mills, W. S. Longbottom, representative, has been removed from the Forrest Bldg., 119 So. 4th Street, to room 623 Bourse Bldg.

J. C. Macpherson, of the Philadelphia office of the Argo Mills Co., Gloucester City, N. J., high grade cotton yarns, has been in Virginia this past week on a hunting trip.

(*Continued on page* 471)

CANNON YARNS

CONFIDENCE

Confidence largely rests upon experience.

Our experience, gained by the spinning of Cotton Yarns according to a required standard, has given us an absolute confidence in

CANNON YARNS

Textile manufacturers who have been using Cannon Cotton Yarns for many years past have learned to rely upon them, because of their dependable quality, uniform grade, economy in use, and satisfactory results.

Their experience, added to that of our service in studying your requirements, should convince you that you also should use

CANNON YARNS

CANNON MILLS
PHILADELPHIA

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READING, PA. AMSTERDAM, N. Y.

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UNDERWEAR
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SWEATER
WEAVING

YARNS

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OXFORDS
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French and English Spun Worsted
French Spun Worsted Merino

BOTANY WORSTED MILLS PASSAIC N. J.

FINE FRENCH SPUN WORSTED YARNS
Of Every Description for Knitting and Weaving

Represented by
WALTER D. LARZELERE, 704 Commercial Trust Bldg., Philadelphia, Pa.

The Pitkin-Holdsworth Worsted Co.

PASSAIC, N. J.

Spinners of Worsted Yarns in the Gray for Weaving and Knitting

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Top Makers and
Worsted Spinners
for
Men's Wear, Dress Goods and Knitting Trade
both in Grey and Mixtures

F. A. STRAUS & CO.

451-453 Fourth Ave., NEW YORK CITY

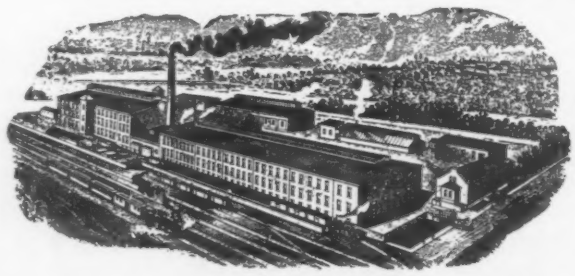
SPINNERS OF

Worsted Yarns for Weaving and Knitting

Mills,
Trenton, N. J.

Thrown and Artificial Silks

MERION WORSTED MILLS



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Fine French-Spun Worsted and Worsted Merino Yarns

WHITE NATURAL AND FANCY MIXES IN SINGLE AND PLY FOR KNITTING AND WEAVING

Mill and Office
WEST CONSHOHOCKEN, PA.

Worsted Yarns

PASSAIC WORSTED SPINNING CO
PASSAIC N. J.

Bradford System

JAMES DOAK JR. COMPANY

WORSTED SPINNERS

KENSINGTON PHILADELPHIA

JAMES LEES & SONS CO.

MINERVA MILLS

SPINNERS OF
WORSTED YARNS
for KNITTING AND WEAVING

In the Grey and in all colors
and mixtures

Mills and Offices, Bridgeport, Montgomery Co., Pa.
Philadelphia Office, 627-29 Bourse Bldg.

A. N. BRIGGS COMPANY

TOPS **YARNS** NOILS

WOOLEN WORSTED MOHAIR

Boston and Philadelphia

ASHWORTH-ODELL WORSTED CO.

Worsted Yarns

Salamanca, N. Y. Selling Agents—A. N. BRIGGS CO., 185 Summer St., Boston, Mass.

FALLS YARN MILLS

FINE WOOLEN AND MERINO YARNS

WOONSOCKET R. I.

Incorporated 1904

Philadelphia Representative
H. R. SHIRLEY
241 Chestnut Street

YARN MARKETS—Continued

QUOTATIONS

WORSTED YARNS.

BRADFORD SYSTEM.

2-12s to 2-16s low common	1 80	—	1 90
2-30s to 2-34s low ¼	1 85	—	1 90
2-20s to 2-25s ¼ blood	1 95	—	2 10
2-26s to 2-30s ¼ blood	2 00	—	2 20
2-32s ¼ blood	2 05	—	2 25
2-20s ⅜ blood	2 15	—	2 25
2-26s ⅜ blood	2 20	—	2 30
2-32s ⅜ blood	2 30	—	2 35
2-36s ⅜ blood	2 35	—	2 50
2-32s ½ blood	2 65	—	2 70
2-40s ½ blood	2 70	—	2 80
2-40s Australian	Nominal		
2-50s Australian, 70s quality	Nominal		
2-60s Australian, 70s quality	Nominal		

FRENCH SPUN.

1-20s quarter	2 00	—	2 10
1-20s high quarter	2 10	—	2 20
1-20s ⅜ blood	2 55	—	2 60
1-30s ⅜ blood	2 65	—	2 70
1-20s ½ blood	2 75	—	2 80
1-30s ½ blood	2 85	—	2 90
1-40s ½ blood	2 95	—	3 00
1-50s	2 90	—	3 00
1-40s Australian	Nominal		
1-50s Australian	Nominal		
1-60s fine Australian	Nominal		
1-70s fine Australian	Nominal		

KNITTING YARNS IN OIL, BRADFORD SYSTEM.

Dyed Prices nominal.

2-5s to 2-10s, ¼ blood	2 20	—	2 25
2-11s to 2-20s, ¼ blood	2 25	—	2 32½
2-20s to 2-30s, ¼ blood	2 30	—	2 35
2-16s to 2-20s, ⅜ blood	2 45	—	2 55
2-18s to 2-24s, ½ blood	2 90	—	2 95
2-26s to 2-30s, ½ blood	2 95	—	3 00

WOOLEN YARNS.

WEAVING.

12 to 16 cut, ¼ blood grade	1 32½	—	1 35
18 to 20 cut, ¼ blood grade	1 37½	—	1 40
12 to 16 cut, ⅜ blood grade	1 45	—	1 50
16 to 20 cut, ⅜ blood grade	1 50	—	1 52½
12 to 16 cut, ½ blood grade	1 57½	—	1 62½
16 to 20 cut, ½ blood grade	1 65	—	1 70
20 to 28 cut, ½ blood grade	1 72½	—	1 77½
28 to 32 cut, ½ blood grade	1 75	—	1 80
30 to 32 cut, ½ blood carbonized	1 77½	—	1 87½
32 to 40 cut, ½ blood and above	1 82½	—	1 87½

KNITTING.

Dyed prices nominal.

Up to 2-15s, in oil	1 42½	—	145
2-15s to 2-23s, in oil	1 47½	—	152½
Up to 2-15s for bleaching	160	—	165
2-15s to 2-23s for bleaching	165	—	167½
Coarser numbers in 10s and lower, 2c. less.			
2-16s to 2-20s cut Oxford ⅝/₃₈	150	—	155
2-21s to 2-23s cut Oxford ⅝/₃₈	155	—	160

CARPET YARNS.

Prices are nominal.

First quality, %	—	—	—
Second quality, %	—	—	—
60-yd. double reel, cotton filling skein	—	—	—
(On cops)	—	—	—
Common	—	—	—
Medium	—	—	—
Best	—	—	—
Extra best	—	—	—
Light supers	—	—	—
Super jute 42-yd.	—	—	—
Super jute (high), 42-yd.	—	—	—
Velvet wool, sun, 150-yd. white	—	—	—
Gray	—	—	—
In worsteds:			
16s 2-ply for ingrains, white	—	—	—
16s 2-ply light gray	—	—	—
16s 2-ply dark gray	—	—	—
13s 2-3 tapestry	—	—	—
16s 2-3 Brussels, white	—	—	—
16s 2-3 Brussels, light gray	—	—	—
In wool carpet yarns:			
Wilton, 3-ply, 72-yd. white	—	—	—
Wilton, 3-ply 72-yd. gray	—	—	—
Velvet, 3-ply, 52-yd. white	—	—	—
Velvet, 3-ply, 52-yd. gray	—	—	—
Axminster, 2-ply, 55-yd. white	—	—	—
Axminster, 2-ply, 55-yd. gray	—	—	—

JUTE YARNS.

Prices are nominal.

For carpets and rugs:

6-lb.	24	—25	
7-lb.	22½	—23½	
8-lb.	20½	—21½	
9-lb.	19½	—20½	
10-lb.	18¾	—19¾	
11-lb.	18¼	—19¼	
12-lb.	18	—19	
12-lb.	17⅛	—18⅛	
14 to 16-lb.	17¾	—18½	
17 to 18-lb.	17¾	—18½	
19 to 24-lb.	17¾	—18¼	
25 to 50-lb.	17¾	—18¼	

For piled yarns from 14 lbs. and upward, ½c. and under 14 lbs., 1c.

Venetian yarn, 11 to 12-lb., 2-ply, gray in skein; black in skein; black in cops.

For Smyrna Rugs:

Rolls	—	—	—
Cops	—	—	—
Super jute, 42 yards	—	—	—

WORSTED YARNS SHOW GRADUAL DEVELOPMENT

Civilian Trade Uncertain—Prices Hold Firm—Knitting Yarns Active and Prices High

The worsted yarn market is said to be showing more or less effects from a realization of the conditions in the raw material and, according to certain factors, is somewhat more active. The results of the auction at Boston are believed to have had a strengthening effect upon both buyers and sellers in confirming the opinion regarding the wool situation. In fact, there are some who have studied the situation closely and watched its varied developments, who predict a shortage of wool, which is likely to become a serious factor. Prices are governed by the law of supply and demand, and therefore advancing prices must necessarily follow.

However, with so many varying influences at work, it is difficult to place the market upon any definite basis. Civilian business is more or less a minor issue, and the situation as regards Government contracts in the future is still at a standstill over the question of the prices fixed by the Government. It is reported, however, that there is an indication that these limits will be raised in order to permit the manufacture of sufficient cloth for Government needs. The trade has been watching the investigation at Washington, with a great deal of interest because of the developments brought out there. There has been all along a strong opposition to the fixed price for fabrics. Many factors assert that it is impossible for the maintenance of a fixed price limit on goods unless there is a restriction on wool costs which could be secured by the Government buying wools outright. Without this they argue there has been too much opportunity for lost time in a dispute over costs.

CIVILIAN TRADE WAITS

The outlook for civilian business is more or less uncertain with openings delayed. For many reasons most manufacturers are said to prefer working for the Government, as conditions controlling shipping and other matters naturally favor plants engaged on this class of work. However, the growing sentiment that all lines of business should be as well employed as possible, and on a profitable basis as far as permissible, it is said should naturally aid in developing a satisfactory industrial condition.

As previously reported, worsted yarn prices are more or less varied. Generally they remain unchanged, as there is tendency on the part of most spinners and manufacturers to hold prices closely as far as possible to the basis which they have attained. There is no question but what prices prevailing on sales made have been well below asking prices. Of course, prices are also governed by the conditions under which the sale is made. Stock lots, or yarns offered for resale are not too plentiful, but there seems to be sufficient around to maintain a price level below that of yarns to be made. In addition to this, the character of the stocks used is also another important item. As a result, each sale usually stands upon its own bottom. Then, too, business of late has been of such a limited character, there has been little opportunity for any revision of prices, or for a more established price level, other than is brought about by the firm raw material market.

KNITTING YARNS DEVELOP

Further developments of activity are indicated in knitting yarns. This condi-

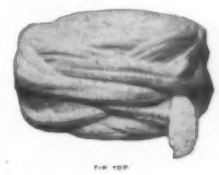
Pocasset Worsted Company, Inc.

Worsted Yarns

OFFICE

10 High St. Cor. Summer - - Boston

Midland Wool Combing Co., Inc.



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THOMAS H. BALL

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YARN
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Manufacturers of
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In the gray and in all colors; also fancy mixtures, and double and twist
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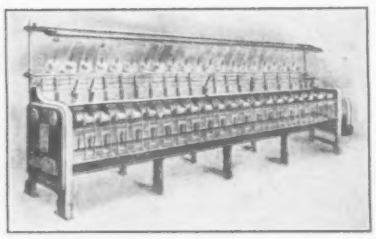
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WILLIAM H. HARRIS
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Yarn Markets—Cont'd

tion applies to both machine and hand-knitting yarns. Those manufacturers who have not already placed their contracts, but have been waiting, apparently have made up their mind if they want the yarns, they must buy now. There is, therefore, no argument over the price. If they want yarns, they pay without question or haggling. In the sweater trade dealers say knitters are buying the usual colors in navy and oxfords for men's lines, with other fancy shades in the greens and blues for women's spring lines. There is said to be little interest in khaki color at present. Government contracts have also given added interest to the manufacturing end in addition to the regular civilian lines. Hand-knitting yarns are also said to be showing signs of revival of interest, following the quiet which prevailed at the end of the year. Spinners are still well engaged on knitting yarns, which usually tax their present capacity. Prices hold firmly.

WORSTED YARNS FIRMER

Successful Sale of Australian Wool Imparts Confidence

BOSTON, Jan. 9—The auction of Australian wool held recently in this city has given a feeling of firmness to the worsted yarn market that was previously lacking. There has been no great stimulation of new business, but the good prices obtainable for these wools running well beyond the normal price parity existing between Australian and domestic fine wools has strengthened the determination of some spinners to make no concessions on the finer counts. The unusual disparity previously noted between 2-40s spot and future has been further limited. Spinners are holding to the figures previously noted around $2.90 to $3.00 and are of the opinion that mills which have sold six months ahead at 30 or 40c. under these figures could by a little waiting have obtained more satisfactory prices for these yarns. Stock lots are now ranging from $2.65 to $2.70; future deliveries are quoted at $2.90 to $3.00. Two-ply 50s are firmer, being quoted for future delivery at $3.10 to $3.15. The consensus of opinion, at time of writing, is that no softening of prices is to be looked for in finer counts.

Price on 2-24s generally speaking remains unchanged and the fluctuations above or below a normal figure, other things being equal, result from the greater or lesser amount of South Americans blended with domestic quarter-bloods. Figures for spot yarns and for future delivery are practically unchanged, $1.85 to $2.00 being quoted in either case.

Two factors have recently appeared in the market to strengthen the opinion of those who believe in stronger prices for yarns. The successful sale of Australian wool as related to the finer counts and the strong South American market based on probable entrance of British buyers into that market as related to 2-24s. These recent events have imparted strength and confidence to this market and it is expected when the situation is considered by yarn buyers business will begin to move on this basis.

To Sell Knitting Yarns

C. R. Stauffer, formerly connected with the sales department of James Lees & Sons Co., Bridgeport, Pa., has severed his relations with that company. He has opened offices at 822 Drexel Building, Philadelphia, where he will handle worsted, woolen and cotton knitting yarns for the trade.

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MARK D. RING'S SON & CO.
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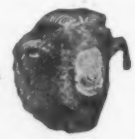
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TOPS AND NOILS STEADIER

Combers Busy and a Feeling of Confidence Growing

BOSTON, Jan. 9.—A certain element of confidence has crept into the market during the last few days, which is very pleasing to makers and sellers of tops and noils. Not that there is anything doing to speak about. The market is distinctly dull from the viewpoint of new developments. The hesitation so marked a feature in the markets which have wool as their base seems diminishing. There is a feeling that something good will be the next on the program. The depressing talk of the effect of Government control of wool has been discounted. It seems now to have no power to affect prices, and there is a growing feeling evidenced, so it is said, in the successful sale at good prices of Australian wool, that present price levels are more likely to rise than to sink. It is considered likely enough that the Government may have to modify the terms under which it reserves the right to take over foreign wools at July 30 prices, less 5 per cent, as there is no evidence of any weakening in the South American market.

The mills are all very busy. They are meeting cheerfully enough the demand made upon them (which in the aggregate is enormous), and in spite of labor troubles, coal shortage and unsatisfactory railroad facilities, are efficiently supplying the country with the goods which when carried a step further in manufacturing make for comfort at home and efficiency abroad. The comparatively few mills which recover the wool fats removed in the scouring process have no reason to complain as to the price they are receiving, 19 cents per pound, as compared with 3 cents before the war.

The market for the finer grades of tops has hardened. Top makers see no reason to expect lower prices. A good-sized lot of fine tops was transferred at $2.15; a large mixed lot of low quarter-blood noils was sold to a dealer at 57 cents.

SPINNERS ORGANIZE

Officers of National Association Have Been Selected

A National Association of Worsted Spinners has been organized by certain of the leading representative men in the trade, as previously announced, and steps are being taken to secure a still larger membership among manufacturers and sellers of yarns. The president of the new association is N. B. Kneas Brooks of Boston, the vice president is Fred Wolstenholme of Thomas Wolstenholme, Sons & Co., of Philadelphia. The members of the Executive Committee are as follows:

Max W. Stoehr, of Botany Worsted Mills, New York.

A. T. Skerry, of A. T. Skerry & Co., New York.

J. W. Fry, of Warner J. Steel, Bristol, Pa.

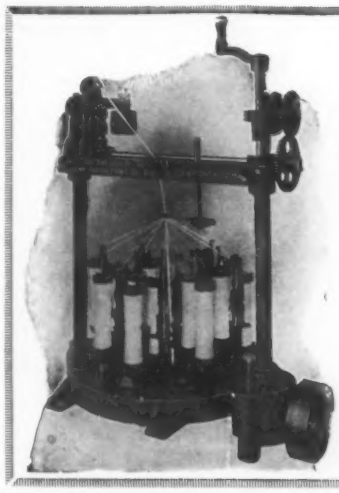
Alonzo Farwell, Pres. Woonsocket (R. I.) Worsted Mills.

J. W. Levering of Erben, Harding Co., Philadelphia, Pa.

Winthrop L. Marvin of Boston, secretary of the National Association of Wool Manufacturers, has been acting as secretary and treasurer of the new association in its organization.

Useful Souvenirs

John F. Street & Co., Providence, R. I., cotton yarns, have presented their friends with their usual handy pocket memo book, with useful information in yarn tables showing relative lengths of yarns, interest tables, etc.



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ACID BLACK	PX
ACID BLACK	PXS
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QUOTATIONS

Prices quoted below were corrected this week on the New York market, and we believe them to be accurate, though largely nominal.

MISCELLANEOUS CHEMICALS.

Acetone	35	—	30
Alumina-Sulphate com.	1¾	—	2¼
Alum-ammonia, lump	4	—	5
Ground	4½	—	5½
Ammoniac, Sal, white, grand	15½	—	16½
Antimony(oxide	16	—	17
Salts, patent, 66%	60	—	—
Argols	16	—	18
Arsenic—white	15½	—	17½
Red	65	—	70
Barium chloride	3¾	—	4½
Bleaching powder, Domestic	1½	—	3
Blue Vitriol	9½	—	10
Do., in carload lots	9	—	9¼
Chrome—Acetate, 20 deg.	9	—	11
Copperas	1	—	1½
Epsom salt, 100 lb.	3 37	—	3 50
Formaldehyde, 40%	19½	—	20
Glauber Salts, 100 lbs.	90	—	1 00
Glycerine (C. P.) bbls., dms., extra	68	—	69
Cans	69	—	70
Distilled, yellow, crude	—	—	67
Light, yellow, crude	—	—	61
Iron—liquor, per gal.	28	—	30
Nitrate, true	7⅝	—	8
Com	1¾	—	2¼
Lead—brown sugar	15	—	16
White sugar (crystals)	16¾	—	17
Magnesium chloride	—	—	—
Potash—Bichromate	44	—	46
Chlorate crystals	39	—	41
Permanganate	4 20	—	4 25
Prussiate red	2 90	—	3 25
Yellow	1 27	—	1 30
Soda acetate	11½	—	13½
Bichromate	—	—	18
Bisulphite, 32 degs., 100 lbs	—	—	—
40 degrees, 10 lbs.	—	—	—
Powdered	6	—	6½
Chlorate	24	—	25
Formatic	30	—	32
Hyposulphite, in bbls.	1 75	—	2 25
Nitrate, tech., 100 lbs.	—	—	—
Refined, lb.	6¾	—	—
Nitrite	40	—	42
Phosphate (Commercial)	4½	—	6
Prussiate	35	—	36
Sulphide, 30% crystals	3	—	4¼
Tartar emetic, tech. powdered	61	—	61½
Do., tech. crystals	60	—	62
U. S. P.	67	—	69½
Cream of tartar—Crystals	54	—	58
Powdered	58	—	59
Tin—Muriate, 54 deg.	—	—	28
36 degs.	—	—	30¼
Crystals	50	—	53
Bichloride, 50 deg.	22½	—	24½
Oxide, bbls.	—	—	85
Zinc chloride	10¼	—	11½
Zinc dust	16½	—	17½

ACIDS.

Acetic, 28%, bbls.	5½	—	6
Citric, crystals	—	—	75
Formic, 75%	35	—	36
Lactic, 22%	5½	—	6½
Muriatic, 18 @ 22 deg.	1¾	—	2½
Nitric, according to strength	8½	—	9½
Oxalic dom.	45	—	46
Norwegian	50	—	—
Sulphuric, 66 degs.	2	—	2½
Tannic, U. S. P.	1 30	—	1 40
Technical	55	—	70
Tartaric, crystals	78½	—	79½
Powdered	77½	—	78½

ALKALIES

Ammonia aqua, 26 deg.	17	—	18½
Borax, refined crystals and powdered, bbls.	8½	—	9
Potash, carbonate, 80-85%.	55	—	60
Caustic, 76%	65	—	80
Soda Ash, 58%, light, 100 lb.	2.90	—	2 95
Bicarbonate, 100 lb.	2 25	—	2 50
Caustic, 76%, 100 lbs.	6 50	—	7 00
Sal, 100 lb.	1 05	—	1 20

NATURAL DYES AND TANNINS

Archil extract conc.	—	—	30
Camwood, ground	18	—	20
Cutch	19	—	21
Fustic: Solid	25	—	26
Liquid	16	—	17
Gambier (in store)	21	—	21½
(To arrive)	—	—	—
No. 2 cube (to arrive)	—	—	—
No. 1 cube (to arrive)	—	—	—
Hematine paste	19	—	24
Crystals	19	—	27
Hypernic chipped	—	—	—
Indigo—Bengal	2 50	—	2 75
Guatemala	2 25	—	2 50
Madras	1 10	—	—
Kurpah	2 75	—	2 90
Indigo extract	26	—	30
Logwood chips	2⅝	—	3½
Extract	—	—	12
Crystals	24	—	27
Nutgalls, blue Aleppo	—	—	—
Chinese	20	—	22
Quercitron, per ton	32 00	—35	00
Extract	6½	—	8
Sumac, basis 28%	—	—90	00
Extract	4½	—	10

DYESTUFF INTERMEDIATES

Alpha Naphthylamine	60	—	70
Aniline oil	26	—	30
Salt	32	—	34
Beta Naphthol, sublimed	65	—	75
Dimethylaniline	65	—	70
Metaphenylene Diamine	1 90	—	2 00
Paranitraniline	1 05	—	1 20

EARTHS, PIGMENTS AND ABRASIVES

Barytes domestic, prime white, ton	30 00	—35	00
China Clay, domestic, ton.	15 00	—20	00
Chrome Yellow	—	—	—
Fuller's Earth, powd., 100 lbs.	1 00	— 1	50
Litophone	6	—	7
Silex	30 00	—35	00
Ultramarine Blue	20	—	50
White Lead (basic sulphate)	9½	—	10
Zinc oxide, Amer. process.	10¼	—	10½

OILS AND SOAPS

Lard oil, prime burning, gal.	2 00	— 2	05
Extra No. 1, gal.	1 45	— 1	50
No. 1, gal.	1 38	— 1	40
Olive oil, denatured, gal.	2 35	— 2	40
Olive oil, Foots, gal.	28	—	30
Red oil, saponified, lb.	14½	—	15
Soap, green olive, imp.	—	—	—
Domestic olive	—	—	—
Chip	—	—	—
Soluble oil, 50% castor, lb.	12	—	14

ADHESIVES AND SIZING MATERIALS

Albumen, Blood	—	—	—
Egg	1 00	— 1	10
Casein	22	—	30
Dextrine—Potato (Domestic)	—	—	14½
Do., corn, carload lots, bags	—	—	7
Do., bbls.	—	— 6	88
Do., spec. dark canary, bags	—	— 6	90
Do., bbls.	—	— 7	03
Glue, Fish, per gal.	1 00	— 1	30
Gum, Arabic, amber sorts.	34	—	35
Gum, Br., carload lots bags	—	— 7	65
Do., bbls.	—	— 7	64
Sago flour, spot	4¾	—	5
Starch, corn, pearl, bags, carload	6 30	— 6	48
Do., bbls., carload lots	—	— 6	58
Potato	12½	—	13
Rice	8	—	10
Wheat	5	—	6
Tapioca flour	—	—	—

DYE MARKET IMPROVED

Better Demand for Chemicals, But Small Supply Restricts Trade

With the progress of the New Year an improved tone is noted in practically all branches of the color market. Inquiry is broader, and there is considerable pressure for deliveries on standing contracts. In chemicals the tone of prices is upward, but dyestuffs are reflecting their growth of production and lower prices on 1918 contracts seem apparent. Coal tar products are somewhat easier to obtain, yet supply is far less than demand.

Several factors have combined to restrict a substantial improvement in chemical trading. Chief among these is the lack of coal, which not only has narrowed production but has held up deliveries. Arrivals of stock in this city have been small, and in several instance the lack of supplies has strengthened values and stopped much of the second-hand sales at less than producers' quotations. Bichromate of potash is held by several producers up to as high as 48c. but it is possible to buy at 44c. in other instances; the stock on hand, however, is limited and free trading is not permitted. A few producers of chlorate of potash are now holding firmly for 42½c., compared with a recent price of 40 to 41c. Spot business in the various descriptions of soda is held to a narrow minimum by small stocks, but considerable future delivery sales have been consummated within the week at strong levels. Trading in bleaching powder is largely limited to future delivery contracts, with a majority of such sales obtaining 2½ to 3c. a pound in drums.

A large movement of coal tar products is impossible under existing conditions, and trading during the week was of rather nominal proportions. Ex-

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CHLORIDE OF LIME EPSOM SALTS
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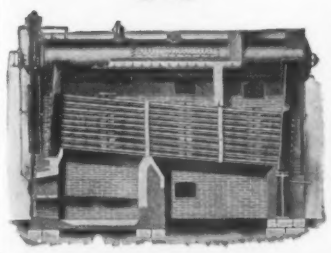

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plosive manufacture is under close Government regulation and the production of dyestuffs for the time being, of course, is a secondary consideration. No changes of consequence are noted in any of the coal-tar intermediates, and all prices are holding firm with an advancing tendency.

While the production of khaki dyes is still mainly diverted to Government requirements, producers have this demand well in hand and are giving increasing interest to civilian demand; in fact, it is stated in a few instances that producers are able to fully meet the latter.

Acids remain in the same tight position that has featured the situation for the past few weeks, and trading is not far removed from a standstill. Under prevailing conditions there is little opportunity for price changes, but producers are not hesitant in predicting advances for the future.

Dye and Chemical Notes

According to reliable information, the National Aniline & Chemical Co., will by May 1 be established in its own ten-story building at 21 Burling Slip, this city. This building has been acquired through the Century Colors Corp., one of the constituent companies of the National.

Heller & Merz, Newark, N. J., has been incorporated by A. Foshay, A. G. Thanum and Arthur William. The capital stock is $1,500,000.

The Delta Oil Company has been incorporated under Delaware laws, with a capital of $50,000. The incorporators are C. A. Cole, Hackensack, N. J.; A. A. Oakley, Pearl River, N. J.; P. E. Britsch, Brooklyn.

Carl J. Schmidlapp, vice-president of the Chase National Bank, New York, has been elected a director of the American Cotton Oil Co., to fill the vacancy caused by the resignation of A. B. Hepburn.

The Mendleson Corporation, Albany, has been incorported by J., I., and L. Mendleson. The corporation is to manufacture and deal in caustic soda, soap, potash, lime and lye. Capital is $2,000,000.

The Lake Shore Chemical Co., Akron, O., has increased its capital stock from $100,000 to $400,000.

The Central Chemical Co., Chicago, has appointed G. A. Clarke as their New York representative; the latter's office is at 217 Broadway.

The Eureka Aniline Products Corp., New York, has been incorporated with a capital of $10,000, by H. P. Velte, H. H. Luhr and R. Bennett.

It is reported that the plant of the Canadian Car & Foundry Co., Kingsland, N. J., has been sold to a company that will utilize it for the manufacture of a general line of chemicals. The property includes 85 acres of land on the main line of the Delaware, Lackawanna & Western R. R.

With the installation of machinery completed, the Richmond (Cal.) Chemical Co. is ready to start operations in its new plant.

The Clinch Valley Chemical Extract Co., St. Paul, Va., recently incorporated, has had plans prepared for the immediate construction of a large by-product plant. The company anticipates that the new works will be in operation early in the spring.

The E. I. duPont de Nemours Co., Wilmington, Del., is said to be planning for the construction of a large dye making plant near Chicago, Ill. It is reported that the company has acquired a site for the works, and will erect a four-story structure for initial operations.

Yarn Markets

(*Continued from page* 463)

William A. Spellisy on Jan. 1, 1918, became associated with J. Spencer Turner Company of New York, in charge of their cotton yarn business in the West, with offices at 208 LaSalle street, Chicago. Mr. Spellisy's long connection with William D'Olier & Co., and later with Chas. J. Webb & Co. has given him a large experience and wide acquaintance in the yarn business.

Linnard T. Rider of Philadelphia (formerly yarn buyer for Schofield, Mason & Co. of Philadelphia) has become associated with J. Spencer Turner Co. of New York in their Philadelphia office at Room 216, Marine & Merchants Building. Mr. Rider will be associated with R. H. Shaen in calling upon the Philadelphia users of cotton yarns.

The Southern Cotton Yarn Co., Inc., has temporarily taken offices at 52 Vanderbilt avenue. After February 1 the company will have offices at 1 Madison avenue. H. Ray Paige, president of H. Ray Paige & Co., exports and imports, is president of the Southern Yarn Co. The vice-president is J. H. Mandeville, general manager of the Mandeville Mills, Carrollton, Ga. J. H. Schoolfeild is secretary and treasurer. Mr. Schoolfeild has been connected with Southern mills for several years. This company is organized as selling agents for yarns manufactured by several southern mills and as exclusive selling agents for the Mandeville Mills, Carrollton, Ga.

DIFFICULT TO SHIP

Yarn Delivered to Buyer Commands Premium

BOSTON, Jan. 9.—Transportation difficulties have become so acute that a premium is being paid by many buyers for yarn that is actually delivered at their mills. One result of the situation is that buyers are forced to purchase from near-by spinners as far as possible. Dealers having stock lots that can be delivered promptly are reaping a harvest, or would be, if their stocks were not generally so small. In this connection it may be stated that there is no evidence of large accumulations of southern yarns, as was predicted would be the case when several dealers placed large contracts back in November.

Until recently it was possible to secure emergency shipments of yarn by express, but now the latter form of transportation has gone to pieces and the motor truck is the only emergency method available. Numerous instances are recorded of yarn being transported from 100 to 500 miles by motor trucks. The situation is rendered more acute by the embargoes declared against certain shipping points, New Bedford having been under the ban the first of the week. Lack of coal is forcing curtailment by some New England and northern mills, and repetition of the recent cold spell would probably force more general curtailment for this cause.

LITTLE CHANGE IN PRICES

While there is no quotable change in contract prices of most counts and varieties of cotton yarn, arbitrary premiums of several cents a pound are being paid on coarse as well as fine counts for prompt delivery. For instance, a buyer who wanted some 24s carded cones promptly, was glad to get a thousand pounds at 62c., taking eastern yarns at this price instead of the southern that he had been using and that are held at not above 58c.

Another buyer who wanted some 2-20s tubes was glad to get eastern yarns at 65c, instead of the southern that he

(*Continued on page* 474)

Textile Manufacturers

Should be interested in DIAX for the following reasons:

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Purer whites are obtained, less tendency to weaken fibres, saving of time and chemicals.

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More level dyeings are obtained with economy of dyestuffs. Thorough degumming of previously dyed and finished goods are easily and cheaply performed.

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ACID CHROME BROWN N
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Finest quality of Materials.

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American Wool Stock Co.
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You can pack it easily and quickly, and store it safely with
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WILL ANNOUNCE SHORTLY WHEN READY TO ENTERTAIN ORDERS IN THAT LINE. MEANWHILE COMMUNICATE WITH US.

RAGS, SHODDY AND WASTE

QUOTATIONS

WOOL WASTE.		
Fine white Australian lap waste	135	—145
Fine white lap waste	125	—130
Fine colored lap waste	85	— 90
Medium colored lap waste	80	— 85
Fine white Australian ring waste	100	—100
Fine white ring waste	90	— 95
Fine white Australian thread waste	95	—100
Hard Ends—		
Fine white	90	—100
Medium white	75	— 80
Coarse white	60	— 70
Fine colored	45	— 50
Medium colored	40	— 45
White spinners' waste, greasy	30	— 35
Colored spinners' waste, greasy	25	— 28
Australian white cards waste, clean	35	— 40
Fine white card waste, clean	30	— 32
Medium white card waste, clean	25	— 30
Colored card waste, fine clean	16	— 18
Colored card waste, medium	10	— 12
Colored card waste, olw	4	— 8
SHODDIES.		
ALL WOOL STOCK.		
White knit stock	55	— 57
Red flannel	—	— 39
Red knit stock	—	— 43
Thibets	40	— 42
Merinos—		
Fine light	45	— 50
Fine dark	35	— 36
Fine black	—	— 33
Coarse light	35	— 36
Coarse dark	27	— 28
Delaines—		
Light	32	— 34
Dark	25	— 26
Worsteds—		
Light	32	— 33
No. 1 dark	28	— 29
Black old	33	— 34
Blue old	30	— 31
Brown old	30	— 31
Serges—		
Black old	32	— 34
Blue old	33	— 35

NEW STOCK.		
Blue clips	24	— 25
Fine blue worsted clips	45	— 47
Fine black worsted clips	45	— 47
Light yarn, extra fine	33	— 35
Dark mixed, extra fine yarn	20	— 25
Dark yarn, med. to coarse	15	— 20
Dark blue hosiery clips, No. 1	20	— 25
NEW WOOLEN CLIPS.		
Fine clips	28	— 29
Ordinary clothing clips	22	— 23
MEN'S WEAR CLIPS.		
Worsteds—		
Dark	27	— 28
Fine dark	37	— 38
Light	29	— 30
Black and white	38	— 40
Brown	36	— 37
Blue	45	— 46
Black	47	— 48
Edges	34	— 36
HEAVY CLIPS.		
Mixed Mackinaws	15	— 16
Mixed overcoatings	17	— 18
Brown chinchillas and cheviots	25	— 26
Blue chinchillas and cheviots	25	— 26
Black chinchillas and cheviots	25	— 26
Oxfords	25	— 26
Black and white	25	— 26
Mixed lights	15	— 16
White chinchillas	46	— 47
Brown lights	19	— 20
Shawls	—	— 15
COTTON WARP CLIPS.		
Dark unions	8½	— 9
Light unions	10	— 11
Serges, black and white	14	— 15
Serges, light	13	— 14
Palm Beach	—	— 15
Delaines mixed colored	6	— 6½
Black astrachans	—	— 13
Blue old	32	— 35
Mixed	—	— 13
Black cloakings	—	— 16
Blue cloakings	14	— 15
Brown cloakings	—	— 15
Mixed cloakings	—	— 9

GOVERNMENT CLIPS.		
Indigo	29	— 30
Khaki	30	— 35
Cadets	38	— 40
FLANNELS.		
Blue	26	— 27
Black	26	— 27
Green	26	— 27
Light	30	— 31
Tan	33	— 34
Mixed	26	— 27
Scarlet	32	— 34
Steel gray	28	— 29
Dark	22	— 23
Fancy	26	— 27
WOMEN'S WEAR CLIPS.		
Serges—		
White	48	— 50
Blue	38	— 39
Black	36	— 37
Brown	38	— 40
Green	38	— 40
Maroon	35	— 36
Light	30	— 32
Tan	40	— 41
Light blue	38	— 40
Mixed dark	22	— 23
OLD WOOLEN RAGS		
Merinos—		
Coarse light	—	— 16
Fine light	—	— 37
Coarse dark	11	— 12
Fine black	16	— 17
Fine dark	19	— 20
Small	5	— 5½
Serges—		
Light	23	— 24
Brown	25	— 26
Blue	—	— 17
Black	16	— 17
Red	23	— 24
Green	25	— 26
Flannels—		
Fine white	38	— 39
Coarse white	35	— 39
White No. 2	28	— 29
Red	21	— 22
Blue	13	— 14
DELAINES AND LINSEYS.		
Skirted	5	— 6
Red flannel	—	— 6
Best plaids	—	— 6
Best brown	—	— 6
Best blue	—	— 6
Common gray	2½	— 3
Knit—		
White	42	— 43
Blue, dark	26	— 27
Blue, light	24	— 25
Blue, mixed	25	— 26
Black, trimmed	26	— 27
Black, untrimmed	23	— 24
Red	24	— 25
Brown	26	— 27
Light gray	11	— 12
Hoods—		
Light	31	— 32
Mixed Hoods	17	— 18
Silver gray knit	35	— 36
SKIRTED CLOTHS.		
Skirted worsteds—		
Light	—	— 15
Black	16	— 17
Blue	16	— 17
Dark	10½	— 11
Brown	16½	— 17½
Skirted cloth—		
Fine light	14	— 15
Light	10	— 11
Blue	7½	— 8
Dark	6	— 6½
Plain black	7½	— 8
Skirted, tan kersey	17	— 18
Skirted, tan covers	18	— 19

COTTON WASTE—MILL RUN.
(See Note.)

	Per cent.	
No. 1 peeler comber	60	— 65
Short peeler comber	50	— 66
No. 1 Egyptian comber	55	— 60
Short Egyptian comber	45	— 55
White card strip	60	— 65
No. 2 white card strip	50	— 55
	Cents.	
Dirty card fly	4	— 5
Dirty picker motes	3	— 4
Card and spinning sweep	3¼	— 4
Weave sweeps	3½	— 4
Soft white threads	13	— 14
Hard white threads	12½	— 13½
Soft colored threads	13	— 14
Hard colored threads	11	— 12

COTTON WASTE—GRADED STOCK
(See Note.)

	Per cent.	
Sakelarides comber	70	— 75
Sakelarides strips	90	—100
Egyptian comber	70	— 75
Egyptian strips	80	— 85
No. 1 white peeler comber	77½	— 82½
Peeler strips	70	— 75
No. 1 white strips	70	— 75
No. 2 white strips	60	— 70
No. 1 white spinners	80	— 85
	Cents.	
No. 1 soiled card	10	— 14
No. 1 oily card	7	— 7½
No. 2 oily card	6	— 6½
No. 1 white willowed fly	12	— 13
No. 2 white willowed fly	9	— 9½
No. 1 cleaned white picker	8	— 11
No. 2 cleaned white picker	6	— 8
Soft white threads	12	— 12½
Hard white threads	10	— 10½
Soft colored threads	11	— 11½
Hard colored threads	8½	— 10

LINTERS.

	f.o.b.N. Y.	
Texas, clean mill run	—	— 6
Texas A	—	—nom.
Eastern, clean mill run	—	— 5¼
Staple linters	—	—nom.

NOTE.—*Percentages based on price of New York Middling Uplands spot cotton for day of shipment.*

UNCHANGED CONDITIONS IN SUBSTITUTE FIELD

Principal Demand for Light Grades of New Clips and Old Rags—Shoddy Dealers Sold Up Until Spring

Little has transpired in the substitute market to change the general trend of conditions, and there is but slight prospect of anything of importance happening during the next few weeks. Stock taking, which has been occupying the time of many factors in the trade, has been practically completed and full attention is being devoted to operations in the market. The cold weather which lasted for over a week put a decided limitation upon transactions between graders and collectors, and the depression occasioned by the unusual climatic conditions has not passed away at the time of the present writing. All indications point to 1918 as a banner year in the history of the substitute trade and optimism seems to be well-nigh universal on the part of those identified with the business.

FEW NEW CLIPS OBTAINABLE

The situation with respect to new clips remains practically the same as it was a week ago. Blue serges and worsteds are in principal demand, while serges and worsteds in general are sought. Desirable merchandise is reported as being scarce and prices have increased in proportion. In the field of old rags, fine light merinos, coarse light merinos, fine light worsteds, fine light cloth, blue and brown serges, brown worsteds and tan cloth are being sought. Such grades as are adaptable to the manufacture of articles desired by the Government are subjected to steady and increasing demand, while the other articles in question find many buyers.

Dealers in shoddy state that considerable civilian demand has arisen during the week, but emphasize the fact that Government demand for khaki, oxford and white overshadows all else. Business is improving and a number of factors in the field state that they are sold up until spring, while some report that they are sold up until May.

SUBSTITUTES STRONG

Mills Are Busy—Opening Year with Confidence

BOSTON, Jan. 9.—The market for wool substitutes differs little from the markets that have preceded it for several weeks past. The shoddy manufacturers are all very busy, and do not anticipate any let up in the call for the commodities they produce. They would feel considerably relieved, however, if the pressure were lifted from the raw materials of which they have scant quantity and applied to the darker stocks of which there is a plentiful supply.

Some of the manufacturers in this line cannot understand why the Government should be so fussy about shade of substitute material intended for blankets for use in the cantonments in this country; it seems to them an unnecessary requirement, in view of the fact that the shortage of light rag materials is, if anything, becoming acuter.

There is a little civilian demand appearing. The mills are carbonizing and dyeing at full capacity, some of them running well into the night. A little trouble is being experienced as to coal supply and shipping facilities, but the labor question seems well in hand. There is a good demand for knit stocks. Card waste light and khaki is easily sold. Rough cloths and mixed softs are up at maximum. The year opens with confidence in a continuance of good business.

FOREIGN MARKETS

BRADFORD TRADE FULLY CONTROLLED

Wool Merchants Seeking Recognition—Permission to Buy and Import—South American Muddle

BRADFORD, Dec. 20, 1917.—Any person interested in the wool textile industry, and who has followed the numerous official announcements made in the public press during the past week, cannot but come to the conclusion that the trade is very much controlled. Order after order is issued, showing how completely the entire industry is in the hands of the Government. We hope the trade is not being drained of its lifeblood. Matters of very great importance have been considered this week at numerous meetings. Events show that the Department is acquiring more power; the trade realizes as the year draws to a close that liberty of action has about gone and to-day the entire trade is "in the cart." Last Monday, for instance, an important meeting of the merchants connected with the British Association of Wool Buyers was held. A full statement was made of what the Executive has done with a view of obtaining some redress, but all the members left after the official reply had been read feeling that little concession was going to be granted. If the writer had to give here a quarter of the verdicts pronounced, there would be a "shine." Wool merchants who have been no parasites, now see what their past efforts are worth, and as a last suggestion the officials are to be appealed to to grant the selling of all off-sorts, both Colonial and British, by public auction, and so give merchants something to do in the way of buying and selling locks, daggings, deal wool and every tail end lot of wool which is made after the fleeces have been sorted. A promise has been given wool merchants that some sorting is to be given them if they have facilities for warehousing and doing the work, but some of the biggest firms have little warehouse accommodation, and really speaking little good has been accomplished by the recent negotiations.

SOUTH AMERICAN WOOLS

At last it has dawned upon the officials of the department that a serious blunder has been made by not encouraging importation of South American wools. Importation of these wools has never been actually prohibited as everyone knows. But the effect has been the same, for every importing topmaker knew that if he bought in Buenos Aires or elsewhere, and the wool was landed in this country, it could not be shifted from Liverpool or any other port without a permit, and the department under the Army Council Order would have claimed it. The wool would have been valued on the basis of the Department's own price list, which would have meant a serious loss for the importer. In days of stress and strain like the present, no importer is likely to risk hard earned cash by importing South American wool, only to have same "collared" by the State. One large topmaker said to the writer that he had landed no Buenos Aires crossbreds since last June, although he would have bought steadily all through the season if he could have been assured of even using up the wool himself, or the Department taking it over, say at 5 per cent profit. The Government's short-sighted policy has cost this country dearly in wool stocks, and now machinery is going to stand idle that could have been run if 100,000 bales of Buenos Aires crossbreds had been brought to this country. The paramount question to-day is not the possibility of buying, or even paying current prices in Buenos Aires, but tonnage. There are to-day big difficulties in the way, but already a few have taken steps to see what can be done. The writer is telling no secret when he says that several Bradford firms have been operating in a most creditable way in South America, and shipping the wool not to Liverpool but to Boston, and profitable business has been the result. Valuable time has been lost, stocks are lower than they might have been, profits have been sacrificed, hardships inflicted upon workers, and the future jeopardised, all of which might have been avoided if a business-like policy had been in operation, which would have been the case but for the cruel crushing hand of State Control.

DEALING WITH WORKPEOPLE

The spectre of standing machinery has gone through the ranks of the workers, and produced anything but pleasant feelings. They know as well as spinners and manufacturers the position, and many are very sceptical as to whether the position of supplies warrants the drastic cutting down that has taken place. Workpeople say that they do not want to see machinery stopped, but rather to be put on short time, and the work available be shared out as equitably as possible. That has been the method which has obtained in days of slackness, and they see no reason to-day for standing machinery, as it means turning off entirely a good many workpeople. The ministry of National Service in their superior wisdom think otherwise, and of course they know. People are not so blind as not to be able to see that there is to be a further combing out of all eligible male employes, and if low category men can be substituted for the few remaining which are in A class, it will be done. There can be no reasonable objection to this in these days of national need. The question was raised the other day whether standing machinery soon spoilt. One of the parties said that he had known spinning machinery to stand over six years and then be run all right, while there is one mill in Bradford in which new spinning plant was installed many months ago, but of which not a single spindle has yet turned. The contention was that if machinery was kept well oiled it did not deteriorate. We were very much surprised to hear that the question of pooling of profits is being seriously discussed in official circles, and the statement was frankly made that there are spinners and manufacturers in Bradford to-day so utterly fed up with State Control that providing they can obtain a reasonable share of profit, they are quite prepared to close down indefinitely. It shows to what a sorry pass things have come in the West Riding when firms are prepared to do that. But there is one serious aspect of the case that must not belost sight of. If a spinner closes down his business—what little is left—will go to a competitor, and the question arises whether he will be able to get back his old customers afterwards. His competitor's yarns may turn out to be better than his, in which case his business will be lost forever. That is a contingency which may arise, but it seems to us that whenever tops are available for spinning, the world will be so hungry for yarns that no spinner will experience any difficulty in selling his complete output both quickly and profitably.

AUSTRALIAN WOOL FOR AMERICA

The position of things across the Atlantic is being watched closely. The news that Washington is going to control American wool stocks has been read with considerable interest. Of course, American wool politics will be properly conducted, our ally having gained considerable experience from the way things have been muddled at this end. If by taking hold of stocks they can nip in the bud all speculation, so much the better. The information received on this side that already the first consignment of Australian wool has arrived at a Pacific port is also an item of more than passing interest. For the trade at this end to be told that the wool has been shipped in British bottoms has come as a revelation. This is more than the trade ever expected. By all means let America have sufficient Australasian wool to satisfy her needs, but being in a position to provide her own freight, that should be, so the trade thinks, an important condition of her helping herself to Australasian supplies. These are days when co-operation is absolutely essential, and in view of Great Britain's serious shortage of freight, America should be called upon to provide her own.

WOOLEN TRADE

The taking of new orders among manufacturers has naturally been brought to a standstill, the firm being exceedingly bold who will to-day place on their books further contracts for delivery next year. As a matter of fact, there are many firms whose entire output on civilian account is sold for the whole of 1918, and as far as one can see this state of affairs is likely to exist until larger wool supplies arrive from Australia. It would be interesting to know exactly the percentage of wool boats sunk, but we are in a position to say that it has been comparatively small during the past month considering the fairly big cargoes which have arrived. Although manufacturers have had their civilian ration cut down, the impression is general that considerable stocks of raw material exist, and that only the making of big provision for eventualities is leading the Department to retail such small quantities. A letter received from one of the first firms of spinners and manufacturers both of woolens and worsteds raises the question: What is happening about contracts for Government cloths and yarns? This firm had been delivering a nice yardage per week of greatcoat cloth; they were told to increase their output, made arrangements to deliver 50 per cent. more, and tendered accordingly. Last week they were officially informed that a contract for little more than half their original order was all that would be given them. In military grey hosiery yarns there has naturally been a big consumption, and firms have worked hard to increase deliveries, but now they are told not to exceed the contract rate of delivery under any circumstances. What does it all mean?

FIRST COMBING.

LITTLE CHANGE IN FOREIGN SUBSTITUTES

Rags and Shoddy Still at a Premium, with England Furnishing 99 Per Cent of Her Own Supply

DEWSBURY, ENG., Dec. 20, 1917.—Since our last report was mailed there has not been any marked change in the local woolen industry. There has been the usual great activity and all the machinery for which labor is available has been working as many hours as possible. Perhaps there has not been as much night work as was the case a few months ago, still there does not on the whole, appear to be any diminution in the quantity of goods turned out. Of course the demand is chiefly for cloth, blankets, flannels and rugs for the services of the Allies, and some mills have orders on hand that will take months to complete.

The working of the civilian cloth trade just now is a very difficult task, and there cannot be much relief for some time to come. Most of the raw materials for cloth making, in the best or lower categories are now being taken for Army goods so that even if more machinery were available for civilian goods there is not an overplus of the essentials in the shape of wool, noils, waste, shoddy. On the whole the view is taken that there is in prospect a shortage of these raw materials, and in certain quarters endeavors are being made to increase supplies if possible. The shipping trade is considerably reduced for obvious reasons, and what is being made for the domestic trade is chiefly for women's wear.

SHODDY TRADE ACTIVE

In the rag and shoddy trades the latter is the more brisk and is working to its full capacity, owing to the fact that such large supplies of military clips and cast-offs of all kinds are coming round and are being used up again into military goods. One can safely say that to-day the shoddy trade is engaged on fully 70 per cent army lines and the largest rag merchants to-day in the world are the authorities who control many hundreds of tons each week drawn from the different fields of war and home camps, and thereby saved an immense amount of money.

The chief feature of the substitute trade this last three weeks has been the abnormal advance in prices all round. One quality has followed in sympathy with another until all along the line there has been, up to a week ago, a rapid advance of everything in the market. To-day the new basis of prices is higher than ever known or anticipated in the trade before. How it has come about is a matter for conjecture, but judging from all that one has seen it had its inception in the fact that one or two firms who had neglected to cover themselves when they had the opportunity some two months ago, for orders they then booked were compelled to go into the market and buy, and competition was the result. Some articles advanced three to four cents per pound inside a week. The rise began in long stapled material suitable for blankets and rugs and then serges and coarse cloth followed until the game became like a snowball and gathered force as it went along. As a result, as remarked above, almost every line participated in the increase; graded goods perhaps, in certain lines, more than mixed.

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This past week a more reasonable attitude has come over the market. The rapid advances seem to have been checked, and more prudence is shown. Efforts in certain directions are being made to bring about a more reasonable state of things so far as prices are concerned, for on the whole they do little or no good to those who handle them. In fact some local graders whose order books were fairly well filled now find themselves forced to buy in order to fill the bill and at prices that involve them in a heavy loss. Many examples could be given where one and another has been caught to the extent of 3 to 4c. per pound. Those who benefit the most are the country senders who consign their collections to the public sales and not local dealers. Still the facts are there and have to be faced. There are rumors in a certain direction that if these high rates ruling are not checked steps will be taken to bring such a change about and the next few weeks are full of possibilities in that particular direction, but it is hoped that the trade itself will set its house in order and see to it that reasonableness prevails.

GOOD SUPPLY OF RAGS

The domestic supply of rags is well maintained, supplies are coming in with freedom and on the face of it one really does not see any diminution in offerings. No doubt the high prices ruling have had the effect of bringing these supplies forward, every one has found out that this cast off material has a real value and is working accordingly. The catalogues of the sales show but little change; they may vary from week to week, but on the whole an average quantity is put on the market each week and is absorbed without difficulty. Something like several hundred tons are available every week and apparently they meet present requirements. There is no export of rags at the moment and but little if any shoddy is allowed to go out of the country. Therefore almost all we have is being used at home. On the other hand imports are diminishing, and sources of supply are now extremely limited outside our own country. There is some hope, however, that a few hundred tons per week may come forward from France very soon.

There is really but one quality where there is any real scarcity and that is in new clips of a bespoke character. So many men being in khaki is the reason mainly, and it is not likely to be changed while the war continues. But it can be confidently said that during the three and a half years of war our supplies have met our demands and no ragpickers have had to go short of rags, they have all been kept working. It is a well known fact that most mills have good reserves of rags waiting for the opportunity to use them; some have taken a long view and are stated to have on hand supplies that will keep them running for at least six months. Available cash has gone in this direction and probably it is a very good investment, for after the war the world will be more hungry than it is to-day for woolen cloth, especially the central empires where it is said they are in a deplorable condition for both men's and women's wear, and any one wanting new clothes has to get a permit from the Mayor, who decides whether or not their attire is sufficiently decent for further wear. If the Mayor agrees such is the case and new apparel is necessary the applicant has to surrender his old clothes for conversion into shoddy and the cheapest material in the shape of woolen stuff to be purchased in Germany to-day is seven and a half dollars per yard.

MUNGO.

Yarn Markets

(*Continued from page* 471)

might buy for future delivery at 56c.

On combed and fine count yarns sellers are extremely independent and asking prices have frequently been advanced as much as 5 per cent although there is no quotable change in actual selling prices. The slowest part of the market is on tire cloth yarn, yet instances are noted where 23s spun from Egyptian "uppers" are held at $1.10 to $1.12 as compared with recent selling prices as low as $1; for Sakelarides Egyptians $1.30 to $1.35 is asked by many spinners. As an actual fact, sellers are not anxious for tire yarn business since they can turn their spindles on to other coarse counts that pay better. Fancy prices are being quoted for fine count Sea Island, owing to the interruption of shipments from England; a sale of 2-98s combed Sea Island was reported at $2.20, and 2-120s combed and gassed is held as high as $3.05, as compared with recent sales at $3.

Boston Cotton Yarn Trade Note

The project for the establishment of an organization in New Bedford for the handling of the mill wastes of that city has been dropped. It is understood that mills and dealers have come to a satisfactory arrangement regarding new contracts. The percentage prices agreed upon are said to come between last year's figures and the low bids made by the dealers.

New Yarn and Cloth Agency

The Great Falls Agency, Inc., 350 Broadway, New York, has been formed with Claude Gore as president and treasurer, and E. D. Tannahill, secretary and manager. The company will act as mill agents for the products of cotton spinning and weaving mills. Branch offices will be maintained at Philadelphia, Boston, Providence, Chicago, Utica and Rockingham, N. C. Mr. Gore is president and treasurer of the Marlboro Cotton Mills, McColl, S. C., also the Great Falls Manufacturing Co., of Rockingham, N. C., and has other extensive interests throughout the South. Mr. Tannahill was for about 24 years associated with Paulson, Linkroum & Co., and its predecessors, Buckingham & Paulson. The products of the Marlboro Cotton Mills, both tire fabrics and yarns, will be sold through the latter's selling organization, E. D. Tannahill representing them on yarns and Ghas. A. Meyers on cloth, with headquarters at 350 Broadway, New York City.

Opens Branch Office

The Textile Yarn Agency has opened a branch office in Philadelphia located at 822 Drexel Building, to take charge of dyeing and deliveries on their worsted, woolen and cotton knitting yarns in that section. This is a branch office of J. Rubenstein & Sons Co., Brooklyn, N. Y.

Navy Awards

WASHINGTON, D. C., Jan. 8.—The Thread Agency, of New York, has been awarded the contract, by the Bureau of Supplies and Accounts, Navy Department, for furnishing the Charleston, S. C., navy yard with the following at $52,560.00, bids for which were opened on Dec. 31: Twelve thousand cones of white cotton sewing thread, No. 36 left twist; 6,000 cones of the same, No. 40; and 24,000 cones of the same, No. 60.

ROCK HILL, S. C. The Victoria Cotton Mills have made application for authority to increase their capital stock from $250,000 to $350,000.

RAW MATERIALS

ADVANCE IN COTTON MEETS OFFERINGS

Above Thirty-One Cents in the South—Speculative Sentiment Unsettled by Political and Trade Uncertainties

New high records have been established in the cotton market during the past week owing to the persistency of trade demand, the continued firmness of the spot situation, nervousness over the new crop outlook in the Southwest, and a more optimistic view of peace prospects. January contracts have sold at 32.42 in the New York market and March at 31.97, compared with 28.38 and 28.00, the low level reached on the decline before the holidays. At this higher level, increased spot sales have been reported, and the market met a good deal of liquidation toward the close of the week with the tone becoming reactionary and unsettled.

There has been a comparatively large spot business in the South during the week, accompanied by reports that the French Government was buying, while there have also been reports of a good demand from New England mills. At times the buying in futures attributed to the fixing of prices for New England mill account has been a prominent feature, and one of the chief features of the week has been the persistency of the demand from houses with both Liverpool and domestic trade connections. Covering by people who had sold on the December setback has been a factor on the advance, and there has probably been considerable replacing by old longs who had taken profits around the 30-cent level.

But while the larger spot sales reported in the South have reflected demand on the one hand, on the other they have indicated increased willingness to sell, and toward the end of the week there was considerable nervousness over the fuel situation in New England mill centers and renewed talk of price regulation. Some improvement was also reported in Southwestern weather conditions which suggested possible relief from drouth and these features combined with the extent of recent advances evidently led to heavy realizing while there was also selling for a reaction. There is some division of sentiment as to the possible effect of peace should it come as a result of present agitation, but the action of the market during the week has indicated that any really definite progress in that direction would still be considered a bullish factor. This view is based, of course, on the scarcity of cotton abroad and a belief that the Central Powers will be forced into the market at the first possible moment. Sentiment as to the probable acreage has not yet crystalized to any extent, but many of the advices received here from the South have suggested that prospects are for an increase in the area planted owing to the extraordinary high prices. The outlook in the Southwest is complicated by the drouth situation. Good rains within the next week or two would relieve anxiety to a considerable extent, but an early start with the South Texas crop is considered most desirable. Spot people returning here from the South say that holders are extremely confident, many of them expecting 35-cent cotton, and willing to sell only slowly on a scale up. No change has been reported in the ocean freight situation and the action of the War Trade Board in suspending the regulation requiring shippers to secure licenses for exports to Allied nations is hardly expected to materially expedite shipments. The temporary closing of mills in the Charlotte section of North Carolina caused some nervousness toward the end of last week, but these mills were reopened on Monday with week-end rains reported which helped the water situation. Reports of increasing scarcity of coal in New England, however, have attracted a good deal of attention and the possibility that mills in that section will be forced to curtail served to encourage reactionary sentiment toward the end of the week. Thursday's closing prices in the leading spot markets of the country will be found below with the usaul comparisons:

Market.	Jan. 3.	Jan. 10.	Chge.	Last year.	Sales.
Galveston	31.00	31.65	+65	18.50	8,219
New Orleans.	30.63	31.50	+87	18.13	23,570
Mobile	31.00	31.50	+50	18.00	219
Savannah	30.50	31.25	+75	18⅝	8,553
Norfolk	30.50	31.25	+75	18.63	2,994
New York	32.70	33.25	+55	18.40	....
Augusta	30.75	31.50	+75	18.75	10,131
Memphis	30.50	31.25	+75	18.50	17,000
St. Louis	30.25	31.00	+75	....	....
Houston	31.00	31.60	+60	18.20	26,211

In addition to the quotations above the following quotations for middling cotton and the difference on and off are given, as compiled from the reports received by the New York Stock Exchange late on Wednesday:

	Dallas.	Memphis.	Montgomery.	Augusta.	Average.
WHITE GRADES.					
M. F.	.88†	1.10†	1.00†	1.00†	1.01†
S. G. M.	.69†	.63†	.75†	.75†	.73†
G. M.	.50†	.50†	.50†	.50†	.50†
S. M.	.25†	.25†	.25†	.25†	.25†
Middling	31.60	31.25	31.75	31.50	....
S. L. M.	.50•	.25•	.25•	.50•	.36•
L. M.	1.25•	.62•	.75•	1.25•	.93•
S. G. O.	2.00•	1.12•	1.25•	1.75•	1.52•
G. O.	2.75•	1.62•	1.75•	2.24•	2.08•
YELLOW TINGED.					
S. G. M.	....	....	.25†	.25†	.23†
G. M.	.10†	Even.	Even.	.12•	.01•
S. M.	.13•	.25•	.25•	.50•	.27•
Middling	.38•	.37•	.50•	1.00•	.54•
S. L. M.	.75•	.50•	.75•	1.38•	.93•
L. M.	1.25•	.87•	1.13•	1.75•	1.44•
YELLOW STAINED.					
G. M.	.75•	.62•	.38•	1.00•	.56•
S. M.	1.00•	.87•	.62•	1.50•	.82•
Middling	1.25•	1.00•	.88•	1.88•	1.16•
BLUE STAINS.					
G. M.	.75•	.57•	.50•	1.00•	.63•
S. M.	1.00•	1.12•	.75•	1.50•	.94•
Middling	1.25•	1.25•	1.00•	2.00•	1.27•

• Off. † On.

Cotton Trade Notes

The census report showed rather a larger ginning than expected to Jan. 1, but did not justify any change of sentiment as to the size of the crop so far as indicated by the recent Government estimate. The ginning with comparisons will be found below:

Season.	Ginned to Jan. 1.	Per cent Jan. 1.	Total Lng.
1917	10,450,401		
1916	11,039,491	97.1	11,363,915
1915	10,636,778	96.1	11,068,173
1914	14,443,146	90.8	15,905,840
1913	13,347,721	95.5	13,982,811
1912	12,907,405	85.7	13,488,539
1911	14,317,002	92.1	15,553,073
1910	11,084,515	95.8	11,568,334
1909	9,647,327	95.8	10,072,731

Acording to the Central Cotton Committee of the Russian Department of Agriculture, the cost of production of cotton in Central Asia for 1917 increased 250 per cent over the production cost of 1916.

The announcement that the War Trade Board had suspended the regulation requiring individual licenses for cotton shipments to Allied countries and colonies attracted some comment. Local shippers, however, say they see no increase in shipments as a result, as the suspension of the regulation does not add to the supply of tonnage or expedite shipments to any appreciable degree, although it reduces the amount of clerical work.

War hospitals in France are planning to use paper pulp fiber tissue for surgical dressings, compresses and bandages in place of cotton or linen.

The most discussed factor on the advance of Wednesday was the reported buying of the French Government in the South. As it was announced early in the season that the French Government had arranged to import 850,000 bales of all kinds for the trade year, and as exports to France thus far this season have amounted only to 300,000 bales, the trade was disposed to accept the reports of increased activity in that quarter.

No definite sentiment as to coming acreage prospects has developed in local trade circles as yet. It is probable that traders will begin to formulate opinions within the next thirty or sixty days. In a preliminary way it is felt that prices are certainly high enough to promote planting and cultivation, but the outlook is complicated by the drouth in the southwest, uncertainty as to the attitude of farmers in the boll weevil sections, who are said to have made a good thing out of diversification, and the situation as to both fertilizer and labor.

COTTON STATISTICAL DATA

COMPARATIVE CROP STATISTICS

	1918.	1917.
Receipts for week	101,021	101,053
Exports for week:		
To Great Britain	35,236	61,963
To France	3,505	4,363
To Continent	10,182	16,410
To Japan	.....	15,395
To Mexico	.....	600
Visible supply: U. S. and Europe	4,627,225	5,815,175
Receipts for season	3,694,361	5,147,824
Exports for season:		
To Great Britain	1,338,308	1,704,317
To France	298,984	463,715
To Continent	434,120	843,182
To Japan	84,319	323,889
To Mexico	4,440	1,000
Total stock, all U. S. ports	1,357,847	1,483,834

FLUCTUATIONS OF FUTURES

Option.	Closed, Jan. 3.	For week, High.	For week, Low.	Closed, Jan. 9.	Chg.
Jan.	31.32	32.44	31.05	32.38	+1.06
Feb.	30.89	....	....	31.96	+1.07
Mar.	30.84	31.97	30.52	31.91	+1.07
April	30.52	....	....	31.60	+1.08
May	30.45	31.58	30.13	31.54	+1.09
June	30.21	....	....	31.31	+1.10
July	30.12	31.25	29.83	31.22	+1.10
Aug.	29.86	....	....	....	....
Oct.	29.26	30.16	28.99	30.14	+ .88
Dec.	....	29.55	29.55	29.95	....

SPOT FLUCTUATIONS FOR WEEK (MIDDLING)

	New York.	New Orleans.	Liverpool.
Friday, Jan. 4	32.35c.	30.63c.	23.10d.
Saturday, Jan. 5	32.40c.	30.88c.	Hldy.
Monday, Jan. 7	32.55c.	30.88c.	23.22d.
Tuesday, Jan. 8	33.95c.	Holiday	23.22d.
Wednesday, Jan. 9	33.30c.	31.13c.	23.31d.
Thursday, Jan. 10	33.25c.	31.50c.	23.48d.

SPOT QUOTATIONS AND STOCKS

	Spot prices.	This week.	Last year.
New York	....	.....	.....
Galveston	31.75c.	287,175	349,715
New Orleans	31.18c.	385,902	497,100
Mobile	31.38c.	9,987	9,640
Savannah	31¼c.	226,929	193,042
Charleston	31.00c.	61,643	63,933
Wilmington	....	49,616	51,130
Norfolk	31c.	86,195	110,345
Baltimore	31.50c.	29,527	4,698
Augusta	31.50c.	162,576	148,571
Memphis	31.25c.	278,024	331,870
St. Louis	31c.	15,550	31,386
Houston	32c.	214,309	238,002
Little Rock	31.25c.	53,722	45,203

FAIR IMPROVEMENT IN SILK TRADING

Yokohama Surplus Decreasing, with Prices Tending Higher—Little Change Here

In the foreign raw silk markets an improved condition is apparent, and particularly is this true of Yokohama. The local market, however, is without important change, and there is a continued tendency on the part of manufacturers to await more positive developments before anticipating the future. Prices are either firm at current levels or showing a strong upward turn.

Within the last week or ten days American buying has been active in Yokohama, and this combined with a demand has brought the surplus down to around 25,000 bales, as compared with between 30,000 and 31,000 bales when the filatures closed. Thus far prices in Yokohama have remained firm at fixed levels, but opinion is quite general that increased trading will be followed by advances somewhat sharp in character.

In China, however, conditions are reversed to those characterizing other foreign markets. Trading has quieted in an appreciable degree, yet French mills are reported to be rather free operators. Prices are somewhat lower, but even at declined figures are far out of Americans' reach. In Shaghai an active demand for new crop tussahs is reported with prices up considerably; some reports state prices have advanced fully 60c. a pound within the last two weeks. Japan is reported to be active takers of tussahs.

Domestic trading is marked by an unchanged quietness, with prices held firmly. So difficult are silk manufacturers finding it to keep their plants in operation that many of them are asking importers to defer deliveries on standing contracts. The coal shortage is the important factor creating operation difficulties. Various trade activities designed to show the benefit in the consumption of silk, as compared with wool, by civilians under war conditions, it is hoped will stimulate business during the coming spring, that will be reflected all through the industry.

Prices remain unchanged as follows:

EUROPEAN.

Grand Extra Classified Piedmont....nom.
Extra Classical Italian 12/14 to 12/18.nom.
Best Classical Italian 13/15 to 24/26.nom.
Classical Italian .....nom.
60 days basis.

JAPAN.

Filature Kansai Double Extra Cracks.6.00
Filature Kansai extra 13/15.....5.75
Filature Best No. 1 Extra 13/15.....5.67½
Filature Best No. 1.....5.60
Filature Kansai No. 1, 13/15.....5.55
Filature Shinshu No. 1, 13/15.....5.50
6 months basis.

CHINA.

Canton XXA Crack 14/16.....5.50
Canton XXB Crack 14/16.....5.40
Canton XXB 22/26.....5.15
Tsatlee Blue Dragon Flying Horse....5.95
Tsatlee Black Lion.....5.90
Tussah Filature 8 cocoon, No. 1-2....3.60
6 months basis

Fall River Print Cloths

FALL RIVER, MASS., Jan. 10 (*Special*).—Cloth market for week has been steady under firm and generally good inquiry for all styles of goods. Mills are reluctant sellers for they are short of both coal and cotton. Prices show advances in most of the odd styles of 1-16 to 1-18c. Sales for week about 110,000 pieces. Quotations are 27 in., 56 x 56, 8⅛c.; 25 in., 56 x 52, 8c.; 25 in., 56 x 44, 6⅞c.; 38 in., 64 x 64, 12¾c.; 38 in., 64 x 60, 12½c.; 39 in., 56 x 44, 10¼c.

The Mark of

Mutual Satis-faction

DAVIDSON'S policy is that you are to be fully satisfied every time we trade. No transaction is considered profitable to us in which our customers are not satisfied with their purchase.

Write us regarding your requirements in
WOOL NOILS WASTE

WM. G. DAVIDSON & CO., INC.
32 SOUTH FRONT STREET PHILADELPHIA, U. S. A.
192 SUMMER STREET BOSTON

RAW MATERIALS—Continued

WOOL AUCTIONS OF MOST INTEREST

High Prices Surprising, but Not Repented—Foreign Markets Irregular—Boston Sales Small

BOSTON, Jan. 10.—Discussion in the wool trade continues to center around the recent auction of Australian wool, and the effect of the high prices realized thereat on the local market. In a general way it may be said that the net cost to buyers was perhaps a shade less for the better grades of merino fleeces than for the pieces and bellies. As usual the actual buyers of given lots are disposed to estimate the clean cost to them on a somewhat lower basis than that placed by their competitors.* According to the shrinkages placed on the various lots by parties accepted as authorities in the trade, the prices realized in the grease meant a clean cost of $1.80 to $2.04 for super fleeces, $1.75 to $1.90 for average fleeces, $1.80 to $1.90 for super pieces, $1.65 to $1.79 for average pieces, $1.75 to $1.90 for super bellies and $1.63 to $1.80 for average bellies. In presenting these figures it must be stated that the estimated shrinkages figured by experts vary slightly from the above basis.

As the sale was going on, there seemed to be a general opinion that prices were extremely high, and that repentance would come "in the morning." Such appears not to have been the fact, as analysis of the prices paid, with full consideration of the quality of the offerings, and the relative cost of similar wool of domestic growth, shows that prices realized were practically on a parity with this market, though absolute comparisons are impossible, owing to the fact that there were no Australian wools offering in this market prior to the sale. One comparison furnished by one of the larger handlers of both domestic and foreign wools, takes choice Ohio fine unwashed delaine as a basis. This grade has recently sold in this market at 75c. in the grease, for wool yielding 39 per cent. This means a clean cost of $1.92 for choice lots. Choice skirted Geelong merinos brought $1.10 for one lot in the sale. Estimated to yield 58 per cent for choice skirted wool, this means a clean cost of about $1.90. In consideration of the lessened cost of conversion of the skirted Australians, compared with the unskirted Ohio delaines, it is claimed that the former is actually cheaper. In one particular, the Ohio grade excels—it is stronger, and thus better adapted to carry the load of shoddy demanded under present conditions.

SOUTH AMERICAN MARKETS UNSETTLED

Unsettled conditions prevail in all River Plate markets. According to some cables, prices are distinctly lower, heavy purchases of round lots of Buenos Aires crossbreds for this country being reported at 66c. cost and freight, land down in Boston. As such purchases will carry any possible export tax that may be imposed before shipment, there is of course the possibility that the cost to the buyer may be greatly increased. Several thousand bales are reported to have been secured for account of Boston buyers on the above basis, but shipments are impossible for the present, owing to the teamsters' strike which is holding up all business. Late cables say that the Argentine Congress has approved the principle of an export tax, but that the details have not yet been worked out. It is expected to be about 4c. per pound, some cables say 5 per cent on value. Latest quotations for skirted wools are 77c. for Buenos Aires 3s, 71c. for 4s, and 67c. for 5s, cost and freight, without duty. Cables from Montevideo report that holders of wool in that market are looking for higher prices and are refusing to sell at the market. In some quarters doubt is expressed as to whether any skirted wools, American-styled, have been bought as low as 66c., but there seems to be much confidence among importers that they will be able to get the needed wools from the River Plate on a basis that will allow them to be sold profitably on the July 30 basis. New clip wools have accumulated very rapidly at Buenos Aires, and there are now said to be 40,000 bales awaiting sale in that market.

In this market, most of the trading has been in carbonizing wools, and in the grades that have been largely in demand of late for use on Government contracts. Good carbonizing South Americans have sold on the basis of $1.30 for 4s, $1.40 for 2s and 3s, and $1.50 to $1.60 for 1s and 2s. Montevideo fine crossbreds have sold at 87 to 88c. for 58s to 60s, and 86 to 87c. for 50s to 56s. Three-eighths-blood Puntas have sold at $1.50 clean, for a good-sized lot. A late cable quotes burry lambs, 3s and 4s, 65 per cent yield at 67c., cost and freight, showing a clean cost of $1.14 to $1.15.

CAPE MARKETS IRREGULAR

Considerable irregularity is noted in Cape markets. Buying for America is at a standstill, owing to the scarcity of tonnage, but Japanese buyers are said to be very keen. Good combing wools are scarce. Purchases to date from the new clip have been approximately 250,000 bales, or about one-half the total clip. Of this the British government has secured 190,000 to 200,000 bales, and other buyers about 50,000 bales. Two steamers have arrived in Boston during the week from South African ports, and much of this wool has come on the market. No sales of combing Capes of moment are reported, but there has been quite free selling of fine scoured clothing Capes, on the basis of $1.40 to $1.50 for domestic scoured, and $1.35 to $1.45 for Colonial scoured. As far as can be learned, there has been little effort to turn over the purchases of Australian wools made at last week's auction, though one dealer claims to have sold about 25 per cent of his purchases at a net profit of 15 per cent. It is impossible to establish quotations as yet, as a large proportion of the offerings went direct to the mills.

Sales of domestic wools have been light, though increasing moderately over those in each of the previous two weeks. A good-sized lot of fine New Mexico wool in the original bags is reported to have changed hands on the clean basis of $1.75 to $1.80. There has also been a fair movement in 12 months Texas wool, 300 bags choice wool selling at 58½ to 61c. in the grease, or $1.70 clean. Another lot of similar wool is said to have brought 64 to 65c., or up to $1.75 clean. No sales of fleeces are noted for the week, though buyers were along the "street" looking for over-stocks of fleeces, after the publishing of the first report on fleece stocks. It is said they found neither stocks nor soft places in the market.

RECEIPTS AND SHIPMENTS

The receipts of domestic wools this week aggregate 2,100,747 pounds, and foreign 8,726,095 pounds, as compared with 4,070,237 pounds of domestic, 5,262,813 pounds of foreign for the corresponding week of last year. The total receipts of domestic wool since Jan. 1 have been 2,354,677 pounds, and foreign 9,300,975, making a total of 11,655,652, as compared with 10,091,562 pounds last year.

The statistics of shipments follow:

Boston & Maine	1,710,600
Mystic Wharf	747,733
Grand Junction	48,090
Boston & Albany	575,288
New York, New Haven & Hartford	1,457,600
By sea	478,200
Total	5,217,600
Last week	3,102,567
Last year	5,679,464
Since Jan. 1	5,702,858
Same period of 1917	8,290,685

WOOL QUOTATIONS

OHIO, PENNSYLVANIA AND WEST VIRGINIA.

Washed.		Unwashed.	
XX & abv.	76—77	Fn. cloth'g.	65—66
Fine del...	80—85	Fine del....	75—76
		⅛ bld.....	77—78
		⅜ bld.....	76—77
		¼ bld.....	75—76

MICHIGAN AND NEW YORK.

Unwashed.		Unwashed.	
Fine del..	..—72	⅛ bld.....	..—72
Fn. cloth'g	..—65	¼ to ⅜ bld.	..—73

INDIANA, MISSOURI AND SIMILAR.

⅛ bld.....	..—70	¼ bld.....	..—71
⅜ bld.....	..—70	Common ...	..—60

CALIFORNIA (SCOURED BASIS).

Sp'g northern & 12mo	65—1 70	S'th. 6 and 8 mo	1 40—1 45
Sp.middle counties.	1 45—1 50	Fall free...	1 35—1 40
S'th 12mo	1 50—1 55	Fall defects	95—1 00
		Carbonized.	1 45—1 55

TEXAS (SCOURED BASIS).

Fine 12mo	1 65—1 70	Fine fall...	1 35—1 40
Fine 8mo..	1 50—1 55		

OREGON (SCOURED BASIS).

Staple, Eastern,No.1.	1 70—1 75	Cloth, East, ern, No.1.	1 55—1 60
Staple, Eastern,No.2.	1 55—1 60	Cloth, East, ern, No.2.	1 45—1 50

PULLED—EASTERN.

Scoured.		Scoured.	
Fine	1 70—1 75	Lambs' Bs.	1 35—1 40
A super..	1 60—1 65	Cmbgs. fin.	1 40—1 45
B super..	1 45—1 50	Medium ...	1 25—1 35
C super..	1 20—1 25	Coarse	1 10—1 15

PULLED (CHICAGO) (SCOURED BASIS).

A super..	1 45—1 50	B super....	1 40—1 45

MONTANA, IDAHO AND WYOMING (SCOURED BASIS).

Stple, fin.	1 75—1 80	Gine cl'thg.	1 65—1 70
Do., ⅛ bld.	1 60—1 65	Fine med..	1 60—1 65

UTAH (SCOURED BASIS).

Fine	1 55—1 60	Fine med..	1 50—1 55

COLORADO AND NEW MEXICO (SCOURED BASIS).

Fine	1 65—1 70	No. 2.....	1 10—1 15
No. 1....	1 60—1 65	No. 4.....	1 05—1 10
No. 2....	1 30—1 35		

NEVADA (SCOURED BASIS).

Fne med.	1 55—1 60	Fine cl'thg.	1 60—1 65

MOHAIR.

Domestic.		Foreign.	
Combing.	70— 72	Turkey	..— ..
Carding..	58— 60	Cape	63— 66

FOREIGN CLOTHING AND COMBING.

Cape (scoured): Combing, choice.	1 65—1 70	Montevideo (greasy): ¼ bld...	68— 70
Combing, good..	1 60—1 65	High	75— 80
Clothing, choice.	1 55—1 60	⅜ bld...	78— 80
Clothing, good..	1 40—1 45	½ bld...	80— 85
		Merino ..	80— 82
		Buenos Aires x-breds:	
		Lincoln ...	63— 65
		High ¼ bld	74— 75
		¼ bld...	70— 72

FOREIGN CARPET.

Aleppo: Washed ..	—..	Khorassan: 1st clip ..	— ..
Wshd.col ..	—..	2d clip. ..	— ..
Angora... ..	—..	Mongolian:	
Awassi	—..	Bijsk.. ..	— ..
Karadi.. ..	—..	Urgo... ..	— ..
Bokhara: White.. ..	—..	M'nchu'n ..	— ..
Colora.. ..	—..	Scotch blk., faced... ..	— ..
China: Comb'g.. ..	—39	Camel's hair (Russ'n) ..	— ..
Wld.ball	40 —43	Servian skin	
Wld. open, ball...	34 —35½	wool	— ..
Willow'd	32½—37	East Indio: Gray	— ..
Unwld..	31 —32	Washed:	
Szechuen	34 —35	Vickan'r	— ..
Cordova	34 —36	Joria... ..	— ..
Donskoi: *Comb'g ..	—..		
Kand'hr. ..	—..		
Georgian: Autumn	27 —28		

* Nominal.

Publication of our table showing imports of foreign wool is suspended because of inability to secure Government statistics.

INTEREST DEVELOPS

Wools Get More Attention Following Auction—Firmer Prices

PHILADELPHIA, Jan. 7.—There has been little chance as yet for the development of pronounced activity in wools. Although the holidays with their customary quiet are over, still the trade is waiting more or less to see what will happen as a result of the auction of Australian wools at Boston. The results were just about what were generally expected on spot lots of combing wools which were desired by mills engaged on high grade fabrics who eventually proved to be the leading purchasers.

PULLED WOOLS FIRM

Pulled and scoured wools are also showing the general condition of the trade with only scattered sales, although there is said to be rather more inquiry for fine wools since the Boston auction. Stocks are limited and dealers state it does not seem as if there is much wool being offered, so there is little chance to replace lots once sold. It is felt there will be a good demand for wools of medium grade because of the continued interest in knitting yarns requiring large quantities of these wools. Prices generally are holding firmly with little or no change. A sale of a very choice brushed B wool in the grease was made at $1.28; scoured B sold at $1.50; scoured gray sold at $1.08 to $1.14; black pulled wool sold at 83c; 150 bags of carbonized South American sold at $1.25, including 3s, 4s and 5s grades. There is no change reported in the scouring situation.

NOILS REPORTED INACTIVE

Noils are not very active, from all accounts. Prices are holding to previous levels, with quarter bloods at 75c. up; half bloods around 90 to 95c and fine noils at $1.00 to $1.05. There does not seem to be much desire to push sales as with limited supplies dealers feel their stocks will be needed. Contracts apparently have been made at full prices, so there is said to be little chance for a decline.

WOOL MARKET QUIET

Little Activity Reported by Trade—Carpet Mills Close Temporarily

NEW YORK, Jan. 11.—Conditions in the local wool market have experienced but slight change during the last few days and but little change for the better is expected in the immediate future. Business has been reduced considerably and uncertainty in the trade as to the new condition of affairs as embodied in the recent announcement of the War Trade Board has served to put a temporary quietus on activity. Demand for fine wools both scoured and in the grease continues, while those grades suitable to the needs of the Government in the maufacture of uniforms are being continually sought.

CARPET WOOL DORMANT

Little activity is reported in the carpet wool trade, although the demand for better edge carpet wools for better than carpet purposes still continues. The recent cold weather, with its attendant coal shortage, resulted in a number of carpet mills closing for the time being. As the result of this temporary discontinuance of production demand for wool, which had been slight up to that time, fell off until it became reduced to practically nothing. In view of the stocks held by mills which are sufficient for their needs there seems to be little probability of heavy buying for some time to come.

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A Directory of Textile Brands and Trade Marks

The first edition of this new directory will shortly go to press for publication at an early date. It will list over 13,000 brand names and trade marks of textile products, describing the products, the channel of sale and names of first-hand distributors. Being the only source of information of this nature, it will fill a long-felt want among manufacturers, distributors and buyers of textiles. The advance sale indicates a big demand.

There is still time to arrange for display advertising in the directory. Many of the foremost firms owning trademarks and brand names have already taken display space. The already assured use of the directory by buyers of textiles throughout the country is an indication of the value of this advertising. We strongly recommend it as an investment of unusual merit—one which will insure the identity of *your* goods among all buyers of textiles.

Write at once for complete information, including sample pages.

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We make no charge whatever if it fails to do the work.

Regular Price $5.00 Per Gallon

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MOTH DOOM is not explosive, and will not stain or injure in any way, cloth, yarns, wool, clothing or the wrappings.

There is positively no objectionable feature connected with its use. It kills the moth worm and destroys the eggs instantly, and the slight pleasant odor disappears almost as soon as the goods are sprayed.

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SOUTHERN BRANCH,
308 Masonic Temple, Greenville, S. C.

Substitute Markets

(*Continued from page 472*)

waste light and khaki is easily sold. Rough cloths and mixed softs are up at maximum.

COTTON WASTES PROBLEMS

Percentage Controversy Centers Upon Combers—Linters Stronger

BOSTON, Jan. 9.—There is a great deal more uncertainty prevailing regarding contracts for mill wastes than is usual at this time of the year. The whole situation seems difficult and obscure. The divergence of interests in mill and dealer is very marked and even the best informed men are in doubt as to the immediate outcome. The controversy centers upon combers. A large accumulation of this material has taken place and an authority figures that for every three bales now being produced there is an outlet for but two and that relatively there is less combing stock being used than formerly, owing to many mills previously on cotton hosiery now being occupied on woolen goods; and that unless comber waste can be brought down to a price at which it will compete with lower grades this particular stock will continue to pile up.

It is clearly understood by both sides that the intrinsic value of combers is not in question. It is a most valuable secondary product of the mill, being clean good new cotton. The intrinsic value of the goods from the distributor's standpoint does not cover satisfactorily the case at issue. If the supply is greatly in excess of the demand gold itself will fall. The accumulating stock of combers besides furnishing the problem of its own disposal lowers, below its real value, that portion of the stock for which a market can be found.

It would seem as though the problem is one which calls for something more than attempts on the part of individuals. The cotton industry is so up-to-date and efficiently organized that it would seem as though some concerted effort would be made by duly appointed members of the conflicting interests to reach some satisfactory solution.

Cotton Waste Banquet

The annual banquet of the American Cotton Waste Exchange was held Tuesday night at the Hotel Brunswick, Boston, with some 200 members present. President Philip A. Green, of the exchange, acted as toastmaster, and in a short address referred briefly to the manufacture of cotton and to its by-product, in the course of which he declared that the term, "cotton waste," is a misnomer. "The American Cotton Waste Exchange," he said, "was organized in part to educate the country what cotton waste really was." He stated further that not only was practically every domestic cotton waste concern a member of the organization, but that also several English dealers were included in its membership. Samuel H. Roberts, secretary of the exchange, referred to the Tobacco Fund for soldiers of a Providence paper, and a collection taken for this amounted to $500. The speakers included John F. Fitzgerald, ex-Mayor of Boston; David I. Walsh, ex-Governor of Massachusetts; Joseph A. Conroy, Russian Consul at Boston; Brig.-Gen. Chas. Flammond, of the French army. S. R. Greene was chairman of the Committee on Arrangements.

Substitute Trade Note

S. Rawitser & Co., Inc., announce that their Boston office has been removed to 10 High street.

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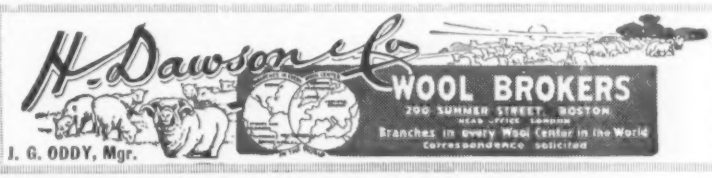

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BRITISH WASTE PRICES

By-products of the Trade Making Record Figures

Our Bradford correspondent writing under date of December 6th says that by the publication of the new list of prices for laps and wastes, the Department is making record prices. The list needs no comment and a copy of the order and all details is given below:

Notice is given by the Director of Wool Textile Production that on and after December 1st, 1917, the Issue Prices for worsted spinners' laps and waste, worsted spinners' dyed noils, worsted manufacturers' waste, and hosiery waste shall be as set out in the Schedule hereto attached, and all lists of prices published previously are hereby canceled.

Notice is also given, that on and after December 1st, 1917, no person shall sell for export any laps or waste as described in the Schedule hereto attached without a permit issued by or on behalf of the Director of Wool Textile Production.

Notice is further given, that no dealer in worsted spinners' laps shall convert or cause to be converted at any time any laps into tops without a permit issued by or on behalf of the Director of Wool Textile Production.

Contracts entered into at any time prior to the 1st day of April, 1917, may be completed by delivery before the 31st day of December, 1917. Contracts entered into since August 1st, 1917, for a definite quantity of material must be fulfilled at the price agreed upon at the time of signing the contract. All other contracts will stand canceled on November 30th, 1917.

SPINNERS' DYED NOILS

	Noble combed.			French combed.		
	Oxford, khaki, and solid shades.	Black.	Col'd.	Oxford, khaki, and solid shades.	Black.	Col'd.
	d.	d.	d.	d.	d.	d.
64/70s	46	43	40	26	28	31
60s	41	42	37	32	33	29
58s	36	39	35	29	30	26
56s	33	34	32	26	27	23
50s	31	32	28	24	25	21
48s	27	27	24	..	..	..
Lister combed 44s	27	27	24	..	..	..
Low crossbred	23	23	20	..	..	..

WORSTED SPINNERS' WASTE

36's and 40's laps, white, 30d.; khaki, 32d.; mixed colors, 29d.

Below 36's laps, 26d.

44's and 46's laps, white, 34d.; khaki, 36d.; mixed colors, 32d.

48's and 50's laps, white, 40d.; khaki, 42d.; mixed colors, 38d.

54's laps, white, 46d.; khaki, 48d.; mixed colors, 44d.

56's laps, white, 51d.; khaki, 53d.; mixed colors, 49d.

58's laps, white, 58d.; khaki, 60d.; mixed colors, 56d.

60/64's laps, white, 66d.; khaki, 68d.; black, 70d.; mixed colors, 62d.

70/80's laps, white, 72d.; khaki, 74d.; black, 76d.; mixed colors, 69d. "All Drawing" laps, 2d. per lb. more than above prices. "All Spinning and Roving" laps, 2d. per lb. less than above prices. Military Shades.—All qualities same price as white. Solid Shades and Oxford laps, 60's quality, and above, same price as khaki. (The term "Solid Shade" shall only apply to a quantity of 400 lb. or upwards.) Black, Solid Shades, and Oxford laps, 58's quality and below, same price as khaki.

36's and 40's hard waste, white, 24d.; khaki, 26d.; military shades, 24d.; mixed colors, 23d.

Below 36's hard waste, 20d.

44's and 46's hard waste, white, 27d.; khaki, 29d.; military shades, 27d.; mixed colors, 25d.

48's and 50's hard waste, white, 31d.; khaki, 33d.; military shades, 31d.; mixed colors, 29d.

54's hard waste, white, 33d.; khaki, 35d.; military shades, 33d.; mixed colors, 31d.

56's hard waste, white, 35d.; khaki, 37d.; military shades, 35d.; mixed colors, 33d.

58's hard waste, white, 37d.; khaki, 39d.; military shades, 37d.; mixed colors, 35d.

60/64's hard waste, white, 39d.; khaki, 41d.; military shades, 39d.; mixed colors, 37d.

70/80's hard waste, white, 42d.; khaki, 44d.; military shades, 42d.; mixed colors, 40d.

Crossbred brush waste, white, 15d.; khaki, 14½d.; military shades and mixed colors, 14d.

Below 36's brush waste, 11d.

Medium, white, 15½d.

Crossbred brush waste, khaki, 15d.; military shades and mixed colors, 14½d.

Merino brush waste, white, 18d.; khaki, 18d.; military shades and mixed colors, 16d.

Clean Faller waste, white botany, 22d.; white crossbred, 15½d.; colored botany, 21d.; colored crossbred, 14½d.

Black and Oxford hard waste same prices as khaki. Mule Spinners' Ring Waste.—Deduct 12d. per lb. from lap prices. Drawing.—8d. more for merino than ordinary brush waste price. Brush Waste.—5d. more for crossbred than ordinary brush waste price.

The term "Solid Shade" shall apply only to quantities of 100 lb. and upwards.

Single Combed Noils.—60's quality and upwards, 4d. per lb. less than Noble-combed prices.

Single Combed Noils.—58's quality and below, 2d. per lb. less than Noble-combed prices.

LAP NOILS

Black, Oxford, and Khaki Lap Noils.—60's quality and upwards, 2d. per lb. less than Khaki Noble-combed price; 58's quality and below, 1d. per lb. less than Khaki Noble-combed price.

Military Cold, Lap Noils.—All qualities, same prices as Mixed Cold, Noble-combed Noils.

Mixed Cold, Lap Noils.—60's quality and upwards, 2d. per lb. less than Mixed Cold, Noble-combed Noils; 58's quality and below, 1d. per lb. less than Mixed Cold, Noble-combed Noils.

WHITE LAP NOILS

64/70's, 41d.; 60's, 39d.; 58's, 37d.; 56's, 35d.; 54's, 33d.; 48/50's, 31d.; 44/46's, 29d.; 36/40's, 26d.

SCHEDULE "A"

WORSTED MANUFACTURERS' WASTE

36/40's weavers' waste, white, 23d.; khaki, 25d.; military colors, 22d.; mixed colors, 21d.; below 36's, 18d.

44/50's weavers' waste, white, 25d.; khaki, 27d.; military colors, 24d.; mixed colors, 23d.

56's weavers' waste, white, 33d.; khaki, 35d.; military colors, 32d.; mixed colors, 26d.

58's weavers' waste, white, 36d.; khaki, 38d.; military colors, 35d.; mixed colors, 29d.

Botany coating waste, white, 38d.; khaki, 40d.; military colors, 37d.; mixed colors, 32d.

Botany bag waste, white, 34d.; khaki, 36d.; military colors, 33d.; mixed colors, 30d.

36/40's thrums, white, 21d.; khaki, 23d.; military shades, 20d.; mixed colors, 18d.; below 36's, 16d.

34/50's thrums, white, 23d.; khaki, 25d.; military colors, 22d.; mixed colors, 20d.

56's thrums, white, 23d.; khaki, 30d.; military colors, 27d.; mixed colors, 22d.

58's thrums, white, 31d.; khaki, 33d.; military colors, 30d.; mixed colors, 24d.

Botany thrums, white, 34d.; khaki 36d.; military colors, 33d.; mixed colors, 26d.

Tabs, botany, 16d.; crossbred, 13d.

HOSIERY MANUFACTURERS' WASTE

Super cashmere rovings, 38d.; super cashmere clips, 36d.; white cashmere rovings, 36d.; white cashmere clips, 34d.; bleached cashmere clips, 36d.; bleached Med. cashmere clips, 33d.; coarse bleached cashmere clips, 28d.; colored cashmere rovings, 23d.; colored cashmere clips, 22d.; cashmere clips on self shades, 27d.; fine natural cashmere rovings, 31d.; Dr. and Undr. fine natural cashmere clips, 30d.; Dr. and Undr. Med. natural cashmere clips, 28d.; Dr. and Undr. coarse natural cashmere clips, 27d.; coarse and Med. natural cashmere rovings, 28d.; white Berlins, 36d.; medium white Berlins, 33d.; fine white worsted rovings, 30d.; fine white worsted clips, 29d.; white worsted rovings and clips, 23d.; Dis. worsted rovings and clips, 21d.; navy worsted rovings, 22d.; navy worsted clips, 21d.; worsted rovings in self shades, 22d.; worsted clips in self shades, 21d.; colored worsted rovings, 20d.; colored worsted clips, 19d.; military rovings, 22d.; military clips, 21d.; Shetland worsted rovings, 22d.; Shetland worsted clips, 21d.; khaki Persian rovings and clips, 20d.; Shetland lambswool rovings, 18d.; Shetland lambswool clips, 17d.; colored golf clips and rovings, 19d.; low mixed waste, worsteds, and woolens, 13d.

Calendars

Thomas H. Wilson, Inc., Philadelphia, Pa., is sending out a very handsome calendar to friends and customers. The principal feature is a reproduction of the painting "Beautiful Lake Louise" by Zula Kenyon. This lake is located in western Canada and is considered one of the most beautiful lakes on the Western Continent. It is surrounded on three sides by snow-capped mountains and at the back appears a glacier.

The Wm. M. Powell Co., Cincinnati, O., manufacturers of brass and iron engineering specialties, is distributing a rather unusual calendar. The principal feature is a hemisphere in blue tones flanked with reproductions of Powell valves on each side, a white calendar being centered in a striking manner. Attached to the card is another calendar in separate sheets, the whole producing a most unique effect.

M. Salter & Sons, Chelsea, Mass., are distributing a very handsome calendar of large size. The principal feature is a reproduction in full color of Percy Moran's painting, "Reading the Declaration of Independence to Washington and His Officers—July 9, 1776." The artist is the son of Edward Moran, the eminent marine and figure painter and the nephew of Thomas Moran, "The American Turner." The calendar attached to the sheet is complete in every detail, while a maturity pad is also added, which will be of great assistance in computing the maturity of notes.

Geo. S. Harwood & Son, Boston, are sending a handsome wall calendar to their many friends, which is both ornamental and useful.

The TEXTILE CLEARING HOUSE

Position Wanted

Cotton Mill Accountant, with twenty-seven years Cotton Mill office experience, at present holding responsible position, desires change of location. Held present position ten years.

Thoroughly competent Textile Accountant, Auditor, Office Manager. Has made a study of Textile Cost Accounting.

Thoroughly familiar with Cotton Mill, Bleachery and Dye House processes and organization.

Address Box 5336, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y.

POSITION WANTED

Boss Dyer, experienced in dyeing and bleaching underwear, hosiery, sweater yarns, raw cotton, wool and jersey cloth. Non-shrinkable worsted underwear, peroxide, chlorine and sulphur bleach.

Address Box 5316, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y.

WANTED

Position as Superintendent or Manager of Cotton Weaving Mill. Have had experience in making upholstery goods, etc., and in the selling end.

Address Box 5331, Textile World Journal, 461 Eighth Avenue, New York.

Situations Wanted

Manufacturers who are in need of superintendents or overseers for any department of mill work may learn of suitable men upon application by mail or telephone to C. T. DONLEVY, care Textile World Journal, 144 Congress St., Boston.

WORSTED YARN SUPERINTENDENT, first-class man desires position as superintendent of a worsted yarn mill on the French or Bradford system. Has experience on all classes of worsted yarns, mixtures, fancy twists, hosiery and knitting yarns, also mohair and carpet yarn. Good references as to character and ability.
O.B.6959, Textile World Journal, Boston, Mass.

OVERSEER OF WEAVING, on plain or fancy, wool or worsted, familiar with Knowles looms. Will not go South or Canada. First-class references furnished.
O.B.6960, Textile World Journal, Boston, Mass.

MASTER MECHANIC, looking for position, has worked on silk, cotton and woolen, familiar with Hoyle, Draper, Crompton & Knowles and Eastwood Machine Company machines. Prefers New England. Good references.
O.B.6961, Textile World Journal, Boston, Mass.

GENERAL SUPERINTENDENT, merchandise man, or assistant superintendent of large mill. Has been general merchandise man all his life, and confidential agent, and superintendent of industries in responsible position. A-1 references.
O.B.6963, Textile World Journal, Boston, Mass.

SUPERINTENDENT OR AGENT, of a cotton mill looking for a position, experienced on all kinds, plain, coarse, fine, fancy and Jacquards. Familiar with Draper looms, Crompton & Knowles, Whitin, Stafford, Saco, Lowell, etc., and can furnish first class recommendations.
O.B.6964, Textile World Journal, Boston, Mass.

CALICO PRINTER, looking for position. 22 years of age, single, Swede. Has good experience in mills in Sweden. Good recommendations.
O.B.6965, Textile World Journal, Boston, Mass.

OVERSEER COTTON FINISHING, folding and packing, preferably folding and packing. Has good experience on ginghams, shirtings, denims, and familiar with many makes of machinery. Good references.
O.B.6966, Textile World Journal, Boston, Mass.

BOSS WEAVER, on silks, jacquards, lapels, ginghams, fancies, plain, tire duck, etc., familiar with Crompton & Knowles Jacquard, and Stafford and Lowell and Whitin machines. Good references.
O.B.6967, Textile World Journal, Boston, Mass.

FOREMAN WINDING, Reeling, spooling, jack spooling, warping and twisting, looking for position, familiar with Foster Winders, combers, and Universal. Experienced on black and white twist, hosiery and all class of cotton yarns. Good references.
O.B.6968, Textile World Journal, Boston, Mass.

Rates: 1 in., $2.50; 2 in., $5.00; 3 in., $7.20; 4 in., $9.60; 5 in., $11.75; 6 in., $14.10. Space used as desired. Further rates on application.

TEXTILE CLEARING HOUSE

Used Machinery
Mill Properties
Situations, Opportunities
Wants, For Sale, Etc.

Men Wanted

WANTED—A Good Competent fixer for Scott & Williams Model K Hosiery Knitting Machine. Also fixer on Banner Machines. When writing state experience and wages wanted.

Address Box 5266, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y. City.

WANTED
DYER
MERCERIZER
WHITE ROOM FOREMAN
CHEMIST

By Large Textile Works in Rhode Island—good opportunity for right men

Address Box 5326, Textile World Journal, 461 Eighth Avenue, New York.

WANTED
COMPETENT FIXER
on S & W-G-KG and B5 Knitting Machines.

GOOD SALARY AND PERMANENT JOB. WIRE

ASHBORO HOSIERY MILLS
Ashboro, North Carolina

Textile Machinery Salesman

WANTED. A High Grade practical man who has had a broad mill experience and who wishes to associate himself in a selling capacity with a progressive machinery house. All replies treated strictly confidential and should give a brief summary of applicant's business experience. Remuneration on a liberal salary and commission basis.

Address Box 5334, Textile World Journal, 461 Eighth Avenue, N. Y.

WANTED
AN EXPERIENCED
WOOL SCOURER

Apply to Ayers Limited, Lachute Mills, Province of Quebec, Canada.

WANTED
Hosiery Mill Manager

For Southern Mill with 2000 dozen daily capacity—Good salary and share of profits to the right man.—Address "Southern Mill," Textile World Journal, 461 Eighth Avenue, New York.

WANTED—Assistant to Agent of Spinning Mill, producing fine yarn of light quality. Excellent opportunity for man with textile training or experience in cotton or worsted mills.

Replies will be held in strict confidence.

Address Box 5323, Textile World Journal, 461 Eighth Ave., N. Y.

Men Wanted

DYESTUFFS SALESMEN

Qualified representatives, wanted to carry complete line of dyes, colors, etc., on a commission basis. Salesmen covering textile, paint, paper and tanning mills, will find it to their advantage to undertake this as a side proposition.

Address Box 5332, Textile World Journal, 461 Eighth Avenue, New York

WANTED—Dye Chemist for testing dyes in dye and chemical factory.

State reference. Address Box 5330, Textile World Journal, 461 Eighth Ave., New York.

WANTED

Cotton yarn salesman thoroughly familiar with New York district and the East, understanding Foreign and Domestic yarns, to work on commission basis.

Address Box 5340, Textile World Journal, 461 Eighth Avenue, New York.

Wanted for our woolen mill, a first-class Boss Dyer, thoroughly experienced on raw stock, yarn and pieces; state age and salary expected. Apply Paton Manufacturing Company, Sherbrooke, Que., Canada.

Business Opportunities

WANTED—Owner of new knitting mill in South; product Half Hose, 176 needle, cotton, will authorize you to sell product, or will manufacture for you at so much per doz., you furnish yarns or they.

Will use $5,000 for one year at six per cent.

Address "B," Textile World Journal, 461 Eighth Avenue, New York.

COMMISSION RAG PICKING

Capacity 5000 lbs. per week

THE OTTER WOOLEN MILLS
Gardner, Mass.

WANTED.

Cotton, wool, worsted or silk yarns, in any quantities.

George Butterworth, Philadelphia, Pa.

CHROME ACETATE

An economical and practical formula for the manufacture of acetate of Chrome, used for years by one of the largest producers, with list of customers and prices, for sale. If interested, Address Box 5327, Textile World Journal, 461 Eighth Avenue, New York.

WELL KNOWN CANADIAN AGENT open for *American Hosiery Mills.*

Address "Canadian Agent," Textile World Journal, 461 Eighth Ave., N. Y.

Business Opportunities

COMMISSION DYEING
Cotton, Wool, Shoddy and Rags
Raw Stock and Skein Dyeing
Government Khaki Shades
And Sulphur Blacks
COMMISSION SPINNING

Business Solicited

WEBSTER YARN COMPANY
WEBSTER, MASS.

We Will Pay Cash for Desirable Lots of Cotton Yarns

We can utilize anything in carded or combed yarns in skeins, warps with or without leases, tubes, cones or yarns on cops or bobbins, etc. Also long strips of selvage or rags.

Send us samples of what you have and name your lowest price.
We will reply immediately.

F. G. LENTZ & CO., WATERLOO AND YORK STREETS, PHILADELPHIA
Reference Ninth National Bank

ATTENTION TEXTILE MILLS

We want your surplus stocks and odd lots of any kind of yarn, thread or cord, in any count, color, form or quantity. Send samples and get our offer. WE ARE CASH BUYERS.

YARN UTILITIES CORPORATION
415 West Broadway, New York
Successors to
The Sanitary Stamped Wares & Specialty Co.

HELLENIC NEW 1918 ANILINES

In addition to colors mentioned in our catalog already mailed you, we are now putting on the market the following *six colors* which are unequalled by any others' offers:

Direct Sky Blue (Greenish)	$5.85 lb
Direct Salmon Pink (Fast to Acid)	6.50 "
Direct Fast Yellow	2.00 "
Direct Green (Yellowish)	2.25 "
Safranine R. Extra (30% above type)	5.75 "
Magenta Crystals (100% soluble)	8.50 "

HELLENIC CHEMICAL & COLOR CO., Inc.
Factory and Office, 427 West 13th Street, New York City
Branches in Boston, Pawtucket, Chicago, Philadelphia and the Coast.

FUCHSINE CRYSTALS

Phthalic Anhydride *Red Prussiate of Potash*

Alex. C. Fergusson, Jr.

458 Chestnut Street Philadelphia

FOR SALE

	Lbs.	Price Per Lb.
Niagara Blue DB	300	$2.05
Dark Navy Blue 3R	100	2.05
Domestic Direct Red C (Becker's)	100	2.65
Methyl Violet	125	3.55
Cyanone Blue 3R	150	2.80
Erie Orange 2R	300	2.55
Niagara Blue 2B	900	2.05
Congo Red 4B	350	2.80
Erie Brown C	600	2.30
Erie Green WT	300	2.55
Erie Black G Ext	500	1.00
Ammaco Dir. Yellow G.N. Special (Becker's)	900	1.50
Yellow 1182 Conc	450	3.05
Methylene Blue BB (Holland)	100	4.55

Address Box 5323, Textile World Journal, 461 Eighth Avenue, New York.

FOR SALE

1000 lbs. National Sulphur Black Liquid Form—80% strength
1000 lbs. 40s Carded Yarn High Grade

Address Box 5335, Textile World Journal, 461 Eighth Avenue, New York.

Koaltar Color Co.
Drexel Bldg., PHILA., PA.

Buy, sell and carry in stock an exceptional line of

DYE STUFFS

Send for samples. Our laboratory is at your service at all times for matching colors.

Rates: 1 in., $2.50; 2 in., $5.00; 3 in., $7.20; 4 in., $9.60; 5 in., $11.75; 6 in., $14.10. Space used as desired. Further rates on application.

TEXTILE CLEARING HOUSE

Used Machinery
Mill Properties
Situations, Opportunities
Wants, For Sale, Etc.

WANTED: A MAN

TO BUILD A

COTTON MILL or KNITTING MILL

In Oklahoma or Texas

Ample assurances can be given you that this is a meritorious proposition. You are urged to consider it.

TEXAS now has sixteen cotton mills.
—thirteen of these mills are on the M., K. & T. Ry.
—all these mills are successful.
—there are no labor troubles.
—there is labor for additional mills.
—local investors will take stock in new mills if organized by a capable, experienced, dependable man, who comes to them with proper credentials.

There is not a single knitting mill in Oklahoma or Texas.
—there is a market in these States and contiguous territory for the products of several mills.

CHEAP FUEL AND POWER

There is not a cotton mill in Oklahoma.
—investors in Oklahoma towns will take stock in either a knitting or cotton mill.

THIS IS A REAL OPPORTUNITY FOR THE RIGHT MAN.

If you are THE MAN, you cannot afford to ignore this appeal.

If you are interested, write to either of the following offices:

INDUSTRIAL DEPARTMENT
MISSOURI, KANSAS & TEXAS RAILWAY

DALLAS, TEXAS — 248 WASHINGTON STREET, BOSTON, MASS. — ST. LOUIS, MISSOURI

FOR SALE — One Parks & Woolson Shearing Machine No. 944, 60½" Cut. Single Shear. Plain Rest. Excellent Condition.
Address Box 5277, Textile World Journal, 461 Eighth Avenue, New York.

FOR SALE—15 Whitin looms, 44" reed space with harness dobbys.
In good running condition. Address Box 5339, Textile World Journal, 461 Eighth Avenue, New York.

WANTED—ROYLE card lacing machine for 400 or 600 hook cards.
Must be in good condition. Preferably one which can be changed to take either size cards. Address Box 5338, Textile World Journal, 461 Eighth Ave., New York.

For Sale—Four Proctor Automatic boarding, drying and stripping machines.
Excellent condition. Phoenix Knitting Works, Milwaukee, Wis.

We Pay Highest Cash Prices for
Mill Remnants, Cotton and Worsted Yarns, Cotton and Wool Waste
Write us what you have to sell
KAPLAND REMNANT CO.
163 North Main St., Providence, R. I.

AUCTION SALE BY ORDER OF COURT
Pursuant to the order of the City Court of Meriden I will sell at public auction (unless previously disposed of at private sale) all the goods, fixtures and machinery of the Meriden Braid Company of Meriden, Conn., on the 15th day of January, 1918, at 2 o'clock in the afternoon at its factory on Veteran Street in Meriden.
It is a fully equipped Braid Manufactory ready to be operated at once.
Sale is subject to approval of court.
December 22, 1917.
JOHN H. YANDO, *Receiver.*

FOR SALE
1 Elliot Cloth Folder, 44" wide, adjustable, 1 yard to 1¼ yard fold.
1 Crompton & Knowles Cap Winder, 20 spindles, for cops or bobbins, spindles geared driven, machine has been little used.
JEREMIAH CLARK MACHINERY CO.
LOWELL, MASS.

WANTED—A 5 cylinder *KITSON PICKER*. State price and condition.
Address Box 5331, Textile World Journal, 461 Eighth Avenue, New York.

WANTED—One Speeder (100 to 120 spindles) 7 inch lift, 4½ inch gauge.
Three Ring Spinning Frames, 6 inch lift, 3 inch gauge.
Address Box 5319, Textile World Journal, 461 Eighth Avenue, New York.

FOR SALE
1 Curtis & Marble—66" Dewing or Spraying machine with rolling up brackets, spreader roll, etc., in first-class condition.
Address Box 5313, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y.

***For Sale*—High speed C & K Ribbon Looms interchangeable parts, 10 to 54 lignes.**
Apply to
HENLEY SILK MILLS
PATERSON, N. J.

FOR SALE—Two new latest type Davis & Furber Woolen Nappers. Never been used—$1,500 each. Present list price, $2,100.
Address Box 5273, Textile World Journal, 461 Eighth Avenue, New York.

SPOOLS FOR SALE
1000 spools 36x10; 1000 spools 37x9
500 spools 35x9; 500 spools 42½x10
25000 spools 3⅛x3⅛; 25000 spools 5x2½
LOOM HARNESS
1000 loom harnesses 56"
John J. Healy, Newtonville, Mass.

WANTED
Twisters with at least 2½" rings or larger.
Worsted Rovers.
500 lb. Klauder-Weldon for Yarn.
6—Jack Spoolers.
2—72" Skein Reels.
Wool Cone Duster. All at once.
W. V. & C. H. PHILBRICK
Textile Employment Bureau
44 Front St., Room 77, Worcester, Mass.

FOR SALE—Two Butterworth Rag Dusters with fans, in good condition.
Write Box 1636, Pittsfield, Mass.

FOR SALE—Woolen Mill Machinery
1—Crompton Knowles—Cam Loom—90", 3 x 3 Boxes, 6 Harness. Complete with a good assortment of Cams . . $175.00
1—Crompton Loom—Dobby Head—90", 3 x 3 Boxes, 24 Harnesses, Tappet Box Motion 125.00
2—Crompton Loom—Bow Jack Head—90", 4 x 4 Boxes, 25 Harness—Regular Box Motion . . . . . Each 200.00
Fully $100.00 worth of new supplies to go with these looms.
2—D. & F. Mules, 240 Spindles each, 1¾ gauge, 24 ends. Heads in good condition. Carriage in fair running order. Each 200.00
1—Waste Duster—Squirrel Cage Style 50.00
1—Curtis & Marble Finishing Room Brush—Old style—with folding and steaming attachments—Fibre Brush 100.00
1—Piece Dyeing Machine—Iron Frame—Rolls and wood work in very fair condition 200.00
The above machines—except the piece dye machine—were in steady operation on 30 os Army Cloth and Mackinaws until this fall. Can give immediate delivery. Terms net cash F. O. B. Duluth.
Patrick-Duluth Woolen Mill, Duluth, Minn.

HYDRO EXTRACTORS IN GOOD ORDER
8 American Extractors, 30" Copper Baskets, Motor and Belt Driven; 1 Schaum & Uhlinger Extractor, 48" Copper Basket, Engine Driven; 2 Schaum & Uhlinger Extractors, 42" Copper Baskets, Engine Driven; 1 Schaum & Uhlinger Extractor, 36" Copper Basket, Engine Driven; 2 Tolhurst Extractors, 40" Copper Baskets, one lead lined; 2 Tolhurst Extractors, 32" Copper Baskets, Belt Driven; 3 Laundry Extractors, 26" Baskets, Steam-Calender, 30 inch, with 3 rolls.
JOHN NUTTALL, 1748 N. 5th St., Philadelphia, Pa.

Bullock Machinery Exchange
USED TEXTILE MACHINERY
109 Washington St., Providence, R.I.
FOR SALE
1—Large Bushnell Yarn Press, Knuckle Joint Type.
1—Continuous Crabbing Machine, 73" Rolls.
1—Napping Machine, 72" wide, 16 Rolls.
1—Napping Machine, 108" wide, 16 Rolls.
3—Phoenix Tenters, 90', 50" goods.
6—Hydraulic Cloth Presses.
2—Leachman Cloth Presses.

Rates: 1 in., $2.50; 2 in., $5.00; 3 in., $7.20; 4 in., $9.60; 5 in. $11.75; 6 in., $14.10. Space used as desired. Further rates on application.

TEXTILE CLEARING HOUSE

Used Machinery
Mill Properties
Situations, Opportunities
Wants, For Sale, Etc

Narrow Fabric Mill Wanted

With Equipment for Weaving

Tapes or Ribbons

Give Details, stating location, description of machinery and reason for Selling. Also advise when can be given possession.

Address Box 5329, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y.

FOR SALE

1—Hunter Stone Dryer.
1—Goddard Burr Picker 48", new.
1—Clark Mixing Picker 48", new.
1—Davis & Furber Box Duster and Blower.
1—Davis & Furber Drosser, Reel & Beamer.
6—Jack Spoolers 40".
1—Foster Tube Winder 100 drums, skein attachment.
8—Collins Skein Winders 5" spools.
8—Draper Automatic Looms 96".
12—Macon Looms 54", 16-harness.
1—Broadbent Extractor 72".
1—Empire Laundry Extractor 26".
1—C. & M. 4-cylinder Polishing Machine 72".
1—Voelker Dewing Machine 65".
1—P. & W. Folding, Winding and Measuring Machine.
2—K. W. Skein Dyeing Machines, 400 lbs.
1—3-bowl Hunter Crabbing Machine.
1—Greene Napper 72".
1—E. Gessner Press 66".
1—Miller Press 84".
1—Woonsocket Napper 80", 36-reel.
1—Erkens & Brix Cross Wool Dyeing Machine with Winder and Zinc Tubes.

NATIONAL MACHINERY CO.
Providence, Rhode Island

FOR SALE

Balance of
Jenckes Spinning Co.'s Silk Dept.
all running
CAN DELIVER LOOMS SHORTLY

SILK WEAVING MACHINERY

Weaving Mill Properties
One of the finest cotton goods weaving mill properties in New England.

Several Southern Mills For Sale

MILLS and Second-Hand MACHINERY
Bought and Sold

E. K. WATSON
Factory—Industrial Broker
WARREN, R. I.

FOR SALE

4—108 in. D & F 3x3 box blanket looms.
6—92 in. Knowles looms 4x4 box 25 har.
11—82 inch Crompton looms 4x4 box 24 har.
8—74 in. Knowles looms 4x4 box 16 har.
16—82 inch single box Atherton looms.
40—40 in. mutual looms 4x1 box 16 har.
2—30 spindle Altemus variable motion bobbin winders.
2—Whitin 378 sp. Long Chain Quillers.
10—16 sp. Saco-Lowell cone winders.
2—J. E. Windle folding and measuring machines.
2—40 spindle Payne upright spoolers.
1—48 inch single gear beaming frame.
2—80 spindle Cleveland twisters 1¾ inch ring.
1—Set 48x48 inch Bridesburg cards.
1—Set of 40x44 inch D & F cards.
200,000—7 inch mule bobbins.
1—Continuous crabbing machine.
1—Curtis & Marble 72 inch spraying machine.
1—48 sp. Lever & Grundy cop winder.
1—180 sp. D & F 2 in. ring twisters.

Armshire & Wheeler
S. E. Cor Bodine and York Sts.
Philadelphia, Pa.

FOR SALE
New 1000 lb.
ALLEN WORCESTER KIER

Has never been used.

Complete with motor driven pump and heater.

CHENEY BROTHERS
SOUTH MANCHESTER, CONNECTICUT

MILL FOR SALE

Good location in Western City. Will sell all or part interest to man who understands making and designing of narrow fabrics. This mill is on a good paying basis with fourteen narrow looms and all necessary winding and warping machinery all new and up-to-date.

For further particulars write in confidence. Address Box 5324, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y.

FOR SALE

CARPET MANUFACTURING PLANT,

in complete running order, comprising Tapestry, Axminster, and Velvet Looms; Printing Machines for printing carpets after woven in the plain. Starching Frame, Spoolers, Shearing Machines, etc. Also a lot of beams, spools, and supplies.

Can be seen upon application to Dedham Carpet Mills, East Dedham, Mass.

EDWIN A. NEWTON Est.
Knitting Mill Machinery

310-312 N. 4th Street
PHILADELPHIA, PA.

Large stock always on hand for quick delivery.

SPECIALS FOR THIS WEEK

15 Wildman Body Machines, 9" to 14".
5 McCreary Nappers, 56" Rolls.
1 Crawford 21 plate cold Press.
28 Acme Knitters 3½" 228 needles.

FOR SALE AT ONCE

Immediate delivery, 16 Worsted Spinning Frames, 144 spindles each, 3½" gauge, equipped with 2" bell-mouth cap, 3¼" traverse. Also Finishing Boxes, Gill Boxes, Weigh Boxes, Drawing Boxes, Dandy Rovers, etc.

Address

POWHATTEN MILLS,
FOURTEENTH AND CROSBY STREETS
CHESTER, PA.

FOR SALE

One 42" Weston Copper Basket Extractor.
One 42" Schaum & Uhlinger Copper Basket Extractor.
Two Tompkins 2 Cylinder Knitting Tables. Cylinders 19"-20". Machines set up for Fleece-lined Underwear.
Three Campbell & Clute 2 Cylinder Knitting tables. Cylinder 17", 18", 19", 20" sold for plain or Plush work.
One 80" Davis & Furber 20 Roll Planetary Napper last used on Fleeced goods.
One 36 spindle Huse Winder.
One 24 spindle Huse Winder.
Six 24 spindle Lindsay & Hyde Winders from cop to bottle Bobbin.
Also full line Knitting Machine supplies, Burr Wheels, Cylinders, Etc.
Full particulars and prices of

A. J. CADY
Successor to R. A. Duckrow, Troy, N. Y.

FOR SALE—AT once 2 sets of Davis & Furber make 48 in. wool cards, well clothed, Bramwell & Bates feeds, Barker rubs.

One Mixing Picker.
One Card Waste Duster.
One Drum Dryer.

A-1 condition.

All can be seen now running at Apollo, Pa., branch of the Colonial Woolen Mills Co.

FOR SALE

Four — 300 H.P. Manning Boilers insured for 150 lbs. W.P. Each.

Two—72" x 20' H.R.T. Boilers, insured for 150 lbs. W.P. Each.

GEORGE J. ADAMS
Consulting Engineer
39 SOUTH STREET, NEW YORK

WANTED

Electric Motors
From 1/4 to 500 H.P.
Leather Belting Wanted

MORRIS BENJAMIN
212 CENTRE STREET
NEW YORK, N. Y.

FOR SALE—Mill property 27,000 sq. ft. Power Plant complete. Shafting. Independent Water Supply. Three tenant buildings. Large acreage. In Northern part of New Jersey, midway between two railroads. Suitable for textile plant.

Price and terms reasonable.

Address Box 5303, Textile World Journal, 461 Eighth Ave., New York.

FOR SALE

4 45" 1x1 Plain Roller Cam Looms.
1 36x72 Elliott & Hall Silk Folder.
1 10 Spindle G & K Cop Winder.
1 Narrow Hydro-pressure Extractor.
1 60" Card Grinder Cylinder.
1 Shoddy Picker.
1 Gerry R. P. Cylinder—new.
1 Butterworth Cylinder.
1 Spooler with compressor, 40⅝" traverse.
2 Wool Dye Tubs. 2 Fire Doors.
1 Cleveland Dresser with sizing attachment.
1 Dodge Shoddy Picker.
1 Butterworth Shoddy Picker, 2 3/16" shaft. Both are fitted with S.K.F. Ball Bearings.

BRIERLY-LOMBARD CO
663-665 Main Street, Worcester, Mass.

WANTED

STONE CARBONIZING DRYER

18 ft. Power Reel with Clock for Skeining Knitting Yarn

Several Johnson & Bassett Mules, 2"-2¼" gauge.
Must be in good condition.

Address Box 5337, TEXTILE WORLD JOURNAL, 461 Eighth Ave., N. Y.

Woolen & Knitting Mill Machinery

For Sale

1—Sargent 2 Bowl Scouring Machine Outfit.
1—Allen Boiling off Kier.
1—Heathcote Horizontal Tenter Machine.
2—Jas. Smith 60-inch Garnett Machines.
16—48" x 48" Cleveland Iron Frame Cards.
250—Latch Needle Knitting Machines. All Makes.
8—TOMPKINS & GORMLY Knitting Tables.
2—TOMPKINS EXTRA LARGE Tables.
25—Campbell & Clute Knitting Tables.

We invite correspondence for Machinery wanted or for sale

Geo. E. Smith Textile Machinery Co., - Cohoes, N. Y.

Established 1870

John Heathcote & Son

Providence, R. I.
Builders of Improved

Cloth Tentering and Drying Machinery

for WOOLENS, WORSTEDS, FELTS, Etc.

Built Upright or Horizontal with Low Down Feed

Ventilating Fans

Send for Catalogue

Rates: 1 in., $2.50; 2 in., $5.00; 3 in., $7.20; 4 in., $9.60; 5 in., $11.75; 6 in., $14.10. Space used as desired. Further rates on application.

TEXTILE CLEARING-HOUSE

Used Machinery
Mill Properties
Situations, Opportunities
Wants, For Sale, Etc.

FOR SALE

THE WELL KNOWN PLANT OF THE

Norfolk and New Brunswick Hosiery Co.

LOCATED AT

New Brunswick, N. J.

consisting of 21 sets of cards 48 x 48. Also Davis & Furber Mules. 288 spindles, 2 inch gauge and all knitting machinery connected with an up to date knitting plant. Also a full line of sweater machinery; complete scouring and finishing plant. Klauder-Weldon stock skein dryer. Sargent wool scourer and dyer.

For full information apply to

JOHNSON & JOHNSON

NEW BRUNSWICK, N. J.

FOR SALE
Fales & Jenks Spinning Frames
For Removal Within 30 Days

6000 spindles of above spinning, including a large number of bobbins used on same. 2¾ inch gauge. Draper No. 2 spindles.

This machinery is now in *full operation producing 23s tire fabric yarn.*

OTHER LARGE OFFERINGS OF GOOD MACHINERY.
WRITE US WHAT YOU WANT—WE PROBABLY HAVE IT.

PHELAN, QUINN & CO.

Specialists in new and used textile machinery.

161 DEVONSHIRE STREET, BOSTON, MASS.
Fall River, Mass. New Bedford, Mass.

SOUTHERN OFFICE
905 Realty Building Charlotte, N. C.

FOR SALE

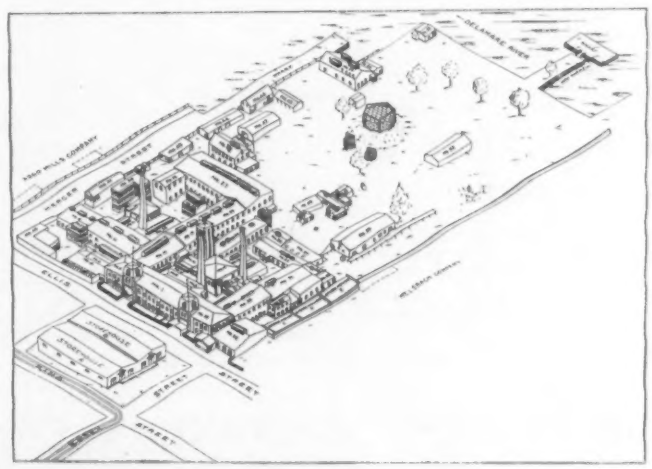
One H. W. Butterworth & Sons Yarn Dryer, capacity 450 lbs. per hour, also a Butterworth Cloth Dryer or Pin Tenter 60 feet long and 45 inches wide, Gessner Presses, Woonsocket Presses, Shearing and Brushing Machines, Cloth Lappers, Calenders, and all kinds of Finishing Machinery for cotton, woolen and worsted goods.

Also 10 Worsted Spinning Frames, Prince Smith and Son make, two Balling Boxes, two Double Can Boxes, 6 and 8 spindle Finishing Boxes and other miscellaneous machinery.

J. K. LAMB TEXTILE MACHINERY COMPANY
246 Chestnut Street Philadelphia, Pa.

Big Plant Suitable for Textile Manufacturing, Dye or Chemical Works Ready for Occupancy at Moderate Rental

LONG-TERM LEASE IF DESIRED



Ten acres, 450-foot frontage on Delaware River, 175,500 square feet of floor space. One and two story brick buildings of mill construction. Big yard, power plant and pumps, 2250 gallons per minute capacity. Convenient to

Three Trunk Railroad Lines

THIS valuable property, on the Delaware River, within four miles of City Hall, Philadelphia, may BE RENTED AT ONCE. Suitable for BIG BUSINESS. Located opposite Philadelphia, this property offers an ideal location in the matter of splendid labor conditions. Near New York Ship Building Company, Pennsylvania Ship Building yards, Victor Talking Machine Company, Argo Mills, etc. Labor, all classes, abundant. Transportation facilities excellent. Surrounded by New Jersey's biggest manufacturing concerns. Full particulars on request, or representative will call if you are sufficiently interested. WRITE OR WIRE.

DAVID S. B. CHEW

825 Commercial Trust Building ∴ Philadelphia, Pa.

Rates: 1 in., $2.50; 2 in., $5.00; 3 in., $7.20; 4 in., $9.60; 5 in., $11.75; 6 in., $14.10. Space used as desired. Further rates on application.

TEXTILE CLEARING HOUSE

Used Machinery
Mill Properties
Situations, Opportunities
Wants, For Sale, Etc.

TEXTILE MACHINERY

For Sale and Wanted

We Buy and Sell New and Second-Hand Machinery

Entire Plants Bought, Sold and Equipped

Advise Us what you have to offer or require

JEFFERSON MACHINERY CO.

DENCKLA BLDG. PHILADELPHIA, PA.

FOR SALE

1—Kitson Opener with Automatic Feed.
1—Kitson 40″ Breaker Lapper.
1—Kitson 40″ Intermediate Lapper.
1—Kitson 40″ Finisher Lapper.
2—Howard & Bullough 40″ Lappers with Carding Beaters.
1—Harwood 36″ Automatic Feeder.
14—Howard & Bullough 40″ Cards, 27″ Doffers, 107 Tops.
42—Saco-Pettee 45″ Cards, 27″ Doffers, 110 Tops.
24—Lowell 40″ Cards, 24″ Doffer, 108 Tops.
12—Hetherington 40″ Cards, 24″ Doffers, 110 Tops.
16—Saco-Pettee Evener Drawing, Metallic Rolls.
40—Deliveries Whitin Drawing, Metallic Roll, 12″ Coilers.
48—Deliveries Howard & Bullough Drawing, Metallic Rolls, 10″ and 12″ Coilers, Mechanical and Elec. Stop Motion.
24—Deliveries Mason Drawing, Metallic Roll, 10″ and 12″ Coilers.
20—Deliveries Saco-Pettee Drawing, Metallic Rolls, 10″ Coilers.
1—Howard & Bullough Slubber, 80 Spindles, 12 x 6.
1—Howard & Bullough Slubber, 44 Spindles, 13 x 6.
7—Saco Slubbers, 60 Spindles, 12 x 6.
4—Lowell Slubbers, 84 Spindles, 11 x 5 1/2.
2—Howard & Bullough Intermediates, 116 Spindles, 10 x 5.
7—Saco Intermediates, 84 Spindles, 10 x 5.
4—City Machine Speeders, 7 x 3 1/2, 160 Spindles.
60—Fales & Jenks Spinning Frames, various lengths, 2 3/4″ Gauge.
2—Whitin Spoolers, 120 Spindles each.
3—Universal Winders, No. 50.
24—Lowell Camless Winders, 16 Spindles each. Several Beam, Ball and Denn Warpers.
50—Draper Automatic 60″ Duck Looms, Model "P", Looms weigh about 3,000 lbs., now weaving Duck, brand new, run only nine months.
128—Draper Automatic 30″ Looms, Model "E," 28 Bobbin Battery, A-1 condition.
8—Whitin Twisters, 144 Spindles each, 7″ gauge, 4″ ring, 5 ply Creels, practically new.
2—Whitin Twisters, 160 Spindles, 5″ Gauge, 3 1/2 Rings.
14,000 Draper No. 2 Spindles with 25,000—7″ Bobbins used on same.

SEE OUR OTHER ADVERTISEMENT IN CLEARING HOUSE PAGES OFFERING SPINNING FRAMES.

OTHER LARGE OFFERINGS OF GOOD MACHINERY.
WRITE US WHAT YOU WANT—WE PROBABLY HAVE IT.

PHELAN, QUINN & CO.

SPECIALISTS IN NEW AND USED TEXTILE MACHINERY

BOSTON, MASS., 161 DEVONSHIRE STREET

Fall River, Mass.
New Bedford, Mass.

SOUTHERN OFFICE:
905 Realty Building, Charlotte, N. C.

MACHINERY FOR SALE

1—Three Card Set 60″ James Smith Cards; Bramwell feed; Barker rub; Sleeved bearings; Clothing and bearings same as new.
1—48 x 48 Finisher Card, built by M. A. Furbush & Son; Barker rub; Spool stand; Sleeved bearings; Clothed complete.
1—Phila. Textile "Cyclone" Combination Dryer for underwear, hosiery, yarn, etc.
1—42″ Extractor, built by Cleveland Machine Works; belt drive.
5—288 Spindle Mules, built by Davis & Furber; 2″ gauge, 24 ends to spool.
40″ Parkhurst Burr Picker with self feed.
30″ Parkhurst Burr Picker with self feed.
30″ Curtis & Marble Goddard Burr Picker, equal to new.
30″ D. & F. Mixing Picker.
30″ Furbush Mixing Picker.
18″ Kitson Rag Picker.
C. & M. Tacking Machine for 54″ goods.
1—Knowles Fancy Gingham Loom, 32″ reed space, 4 x 4 box.
1—Curtis & Marble 6/4 Press.
1—Gessner 6/4 Press.
1—Curtis & Marble 6/4 Sand Gig.
1—3/4 Curtis & Marble Shear.
100,000—7″ Filling Bobbins.
5—Little Joker Waste End Conveyors.
5—48″ Bramwell Card Feeds.
48″ Workers, Strippers and miscellaneous card parts for cards of all makes.

All ready for Immediate Delivery

GENERAL TEXTILE MACHINERY CO.

GERMANTOWN, PHILA, PA.

PUMPS

We have Steam, Electric, and Belt-driven Pumps in stock for prompt shipment.

The following are but a few items from our large stock:

1000-gal. Worthington Underwriters Fire Pump.
750-gal. Smith-Vaile Underwriters Fire Pump.
12 x 14 x 10″ Worthington Tank Pump.
2—14 & 20 x 10 1/4 x 15″ Worthington Pumps.
2—17 x 10 x 15″ Worthington Pumps.
2—12″ Centrifugal Pumps.
1—4″ Centrifugal Pump and Motor.
2—8″ Centrifugal Pumps and Engines.
1—12 x 14″ Goulds Triplex Pump and Motor.
2—5 x 6″ Goulds Triplex Pump.
16 x 20 x 24″ Blake Vacuum Pump.
7 x 14″ Deane Deep Well Pump.

SEND FOR OUR COMPLETE LIST.

WICKES MACHINERY COMPANY, Jersey City, N. J.

Rates: 1 in., $2.50; 2 in., $5.00; 3 in., $7.20; 4 in., $9.60; 5 in., $11.75; 6 in., $14.10. Space used as desired. Further rates on application.

TEXTILE CLEARING HOUSE

Used Machinery
Mill Properties
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MACHINERY FOR SALE

1—3 Bowl Wool Scouring Machine with Dryer attached.
2—Wool Scouring Machines, 26″ wide.
2—Wool Scouring Machines, 36″ wide.
1—Sargent Wood Frame Dryer, 40′ x 7′.
1—Single Can Gill Box, ¾″ pitch.
1—Single Can Gill Box, 7/16″ pitch.
2—Double Cylinder 48″ x 48″ Worsted Cards with feeds.
4—Noble Combs.
8—sets of Noble Comb Circles.
1—Noble Comb Ball Winder.
3—Double Can Gill Boxes.
3—2 spindle Gill Boxes.
2—2 spindle Drawing Boxes, 14 x 9.
1—4 spindle Drawing Box, 14 x 9.
2—4 spindle Drawing Boxes, 14 x 8.
5—6 spindle Drawing Boxes, 10 x 6.
2—6 spindle Drawing Boxes, 12 x 6.
1—8 spindle Finisher, 12 x 5.
2—24 spindle Reducers, 7 x 4.
10—220 spindle Cap Spinning Frames.
2—180 spindle Flyer Spinning Frames.
1—128 spindle Flyer Spinning Frame.
5—144 spindle Cap Spinning Frames.
3—180 spindle Cap Trap Twisters, 4 ½″ x 2⅛″, with Bobbins.
4—160 spindle Ring Trap Twisters, 2 ½″ ring, P. S. & Sons.
1—160 spindle Ring Trap Twister, 2 ½″ ring, H. & S.
1—140 spindle Lowell Wet Twister, 3 ½″ rings.
1—160 spindle Collins Ring Twister, 2 ½″ rings.
6—100 drum Foster Winders.
1—30 drum Foster Cone Winder.
6—72 drum Collins Winders.
2—D. & F. Warping Machines.
1—80 drum Collins 4-ply Trap Spooler.
1—60″ Singeing Machine, two burner.
1—Shriver Filter Press.
1—M. T. Davidson Co.'s Water Power Pump.
1—Tuec Vacuum Suction System.
3—48 drum Altemus Bobbin Winders.
2—Butterworth Rag Dusters with fans.
1—D. & F. Blanket Napper, 14 roll, 90″ on the wire.
1—90″ Teasle Gig.
1—Sargent Burr Picker, Single Cylinder, 24″ wide.
4—sets of 48″ Cards, Furbush make (2 cards to the set).
1—Furbush Mule, 456 spindles, 2 ½″ gauge.
1—36″ Burr Picker, Sargent.
1—24″ Schofield Rag Picker.
1—48″ Garnett Machine, 3 cylinder.
2—D. & F. Twisters, 80 spindles on a side.
1—Bollette Condenser for 60″ Cards.
1—Lever & Grundy 18 drum Spooler (about 1000 spools with this machine).
1—Double Cylinder Burr Picker (Automatic Picker).
1—Single Apron Sargent Dryer, 35′ long, 5′ Apron; capacity 3000 lb. daily.
2—Wright Steady Dial Loopers with Trimmers.
1—Cross Dyeing Tub (Jas. Hunter make).
1—D. & F. 336 spindle Mule, 2 ½″ pitch.
1—English Whiteley Mule, 2 ¼″ pitch, 280 spindles.
1—P. & W. 8/4 Shear.
3—New South Stock Co. Waste Cleaning Machines.
1—Sargent Three Apron Stock Dryer.
1—40″ Belt Driven Tolhurst Self-balancing Centrifugal Extractor.
1—Automatic Feed, 30″ in width.
1—Slatted Table Conveyor, about 10′ long.
3—60″ Smith & Furbush Camelback Lappers.
2—Hosiery Dryers, 250 dozen (all steel).
1—500 lb. Yarn Dryer with two trucks.
1—Klauder Weldon 400 lb. Dyeing Machine, 42 sticks; will take skeins from 54″ to 72″.
1—C. & M. 4/4 Brusher, double acting.
1—C. & M. Tacking Machine for 54″ goods.
1—Sargent Wool Scouring Machine, two bowls.
1—Ernest Gessner Century Press, Press width 76″.
3—Bramwell 54″ Card Feeders.
1—Smith & Furbush Garnett Machine, 3 cylinder.
1—Upright Heathcote Tenter.
1—Collins Bros. Twister, 192 spindles, 2″ ring, 3″ gauge.
48—Looms, 36″ wide.
5—3 cyl. 40″ Shoddy Cards with Bramwell Feeds.
10—Nye & Tredick Body Machines.
1—2 cylinder Garnett Machine, 30 x 40, with Automatic Feed.
1—2 cylinder Garnett Machine, 20 x 60, with Breast and Automatic Feed.
1—3 cylinder Garnett Machine, 20 x 60, with Automatic Feed.
1—Cleveland Dresser (including all Piping and Copper Drum).
2—Spoolers.
1—Allen Cop Winder.
1—6/4 Dewing Machine.
6—D. & F. Cam Looms.
1—D. & F. Up and Down Gig.
1—Crabbing Machine.
1—Steamer.
1—Punch Baller.
1—P. & W. Shearing Machine, No. 944, 60 ½″ cut, single shear with plain rest.
1—Draper Winder for winding yarn from Bobbins to 5″ or 6″ Spools.
1—Jas. Smith 30″ Garnett Machine, two main cyl. and breast cyl.
1—Jas. Hunter Duster and Crush Rolls.
4—Noble Comb Ball Winders.
2—28 spindle Dandy Roving Frames, 4 ½″ pitch, 4″ dia. front bottom rollers.
2—30 spindle Dandy Roving Frames, 4 ½″ pitch, 4″ dia. front bottom rollers.
1—32 spindle Dandy Roving Frames, 4 ½″ pitch, 3″ bottom front rollers.
4—Whitin Machine Works Twisters, 176 spindles each, 2 ½″ ring, 4″ space.
8—Heavy Automatic Draper Worsted Looms, 96″ reed space, 4 harnesses.
1—160 spindle Collins Ring Twister, 5 ½″ traverse, 2 ½″ ring.
1—Butterworth 4 burner 40″ Gas Singeing Machine: also a Gas Making Machine to produce Gas from Gasoline.
2—No. 3 Hussong Dyeing Machines—two propellers each, 33″ x 42″ x 7′ 9″.
1—12 spindle Cop Frame (Lindsay, Hyde & Co.).
1—Burr Picker.
1—2 drum Sizing and Drying Machine (both cylinders made of Copper, with Size Box and Beamer).
1—20 spindle C. & K. Cop Winder.
2—Gessner 2 cylinder Rotary Gigs.
3—6/4 P. & W. Shears.
5—40″ Jas. Barker Rub Condensers.
4—48″ Bramwell Feeds.
4—40″ Apperley Feeds.
1—Birch Bros. 65″ Crab, two Bowl.
1—Steiner Dewing Machine.
1—set of Furbush Woolen Cards, 60″ x 48″ (3 cards to the set).
1—240 spindle D. & F. Mule, 1 ¾″ gauge.
1—396 spindle English Mule, 2 ½″ gauge.
1—Kenyon Cylinder Waste Duster.
1—48″ D. & F. Mixing Picker.
2—Wide C. & K. Cam Looms, 92″.
1—Double Deck 6″ Spooler.
1—set of Josephy Cards and one Ring Spinning Frame.
2—Camless Winders to make 6″ parallel tubes, 16 spindles (Lowell make).
1—Altemus 48 drum Skein Winder, 6″.
1—Double Ledger Blade Shear for ¾ goods.
1—Gessner Press, 66″ wide.
5—sets of Curled Hair Picking Machinery.
63—ft. of Double Belting, 24″.
33—ft. 18″ Belt, heavy double.
1—pair of Squeeze Rollers.
1—30″ American Extractor, with Copper Baskets, belt driven.
1—32″ Tolhurst Extractor, with Copper Basket, belt driven.
1—40″ Tolhurst Extractor, with Copper Basket, belt driven.
1—40″ Tolhurst Extractor, with Copper Basket, belt driven, lead lined.
2—42″ Schaum & Uhlinger Extractors, with Copper Baskets, top engine driven.
1—42″ Schaum & Uhlinger Extractor, with Steel Basket, top engine driven.
1—48″ Schaum & Uhlinger Extractor, with Copper Basket, top engine driven.
1—Heavy Gessner 6/4 Press.
1—Voelker 6/4 Press.
1—12 arm Bailey Yarn Dryer.
1—16 arm Bailey Yarn Dryer.
1—Kenyon 60 yd. Tenter, 7/4.
1—65″ Voelker Press.
1—P. & W. 7/4 Double Steam Brush.

FRENCH DRAWING

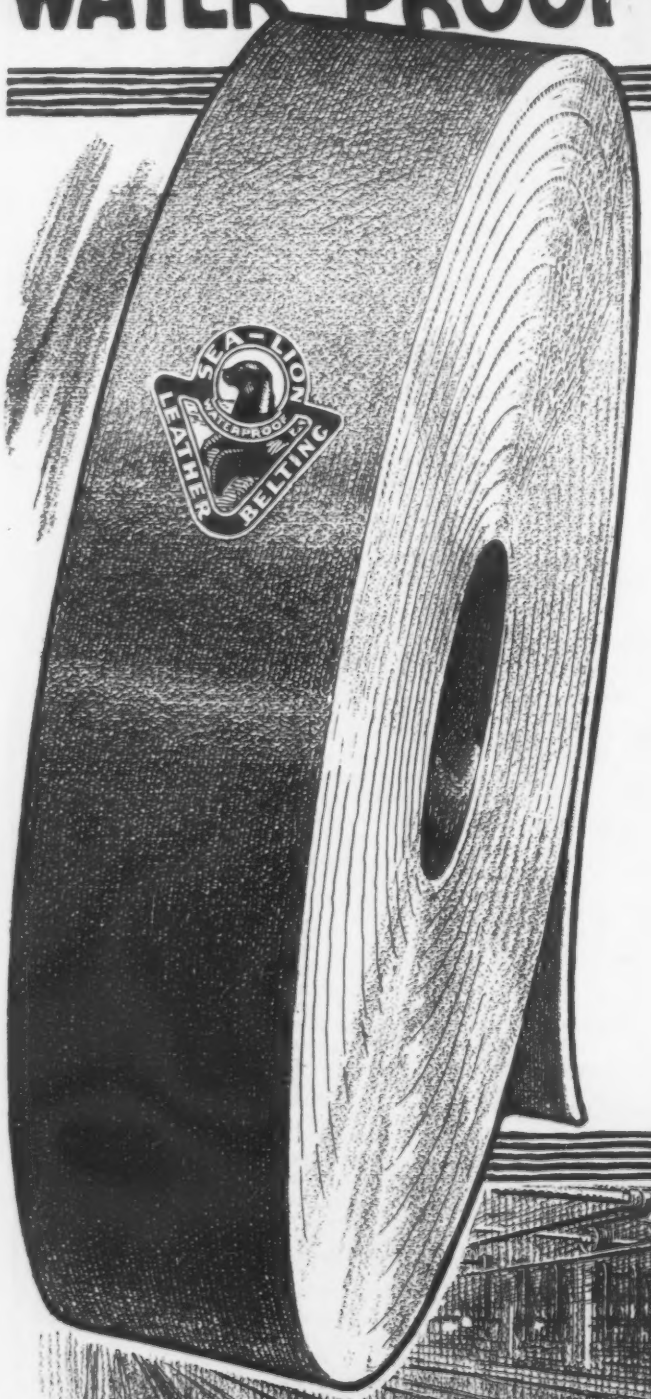
1—6 head 1st Drawing.
1—12 head, 2nd Drawing.
1—12 head, 3rd Drawing.
1—34 head, Intermediate.
1—48 head, 1st Finisher.
2—50 head, Finishers.

EDWARD JEFFERSON

123 South Second Street - - - PHILADELPHIA, PA.

SEA LION

WATER PROOF LEATHER BELTING



For difficult drives in the presence of steam or moisture. Guaranteed not to part or separate at the laps or joints, a guarantee with twenty-eight years of experience and success behind it.

Through all their extensive advertising the Chicago Belting Co. have always kept performance ahead of promise. Therefore you may accept the expression that SEA LION is an earnest attempt to make the best waterproof belting on the market as a conservative statement of what SEA LION actually is.

Write for Free Data Book and Catalog of value and interest to all users of high class leather belting

Chicago Belting Co.

New York
Cleveland
Rockford, Ill.
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105 No. Green St.
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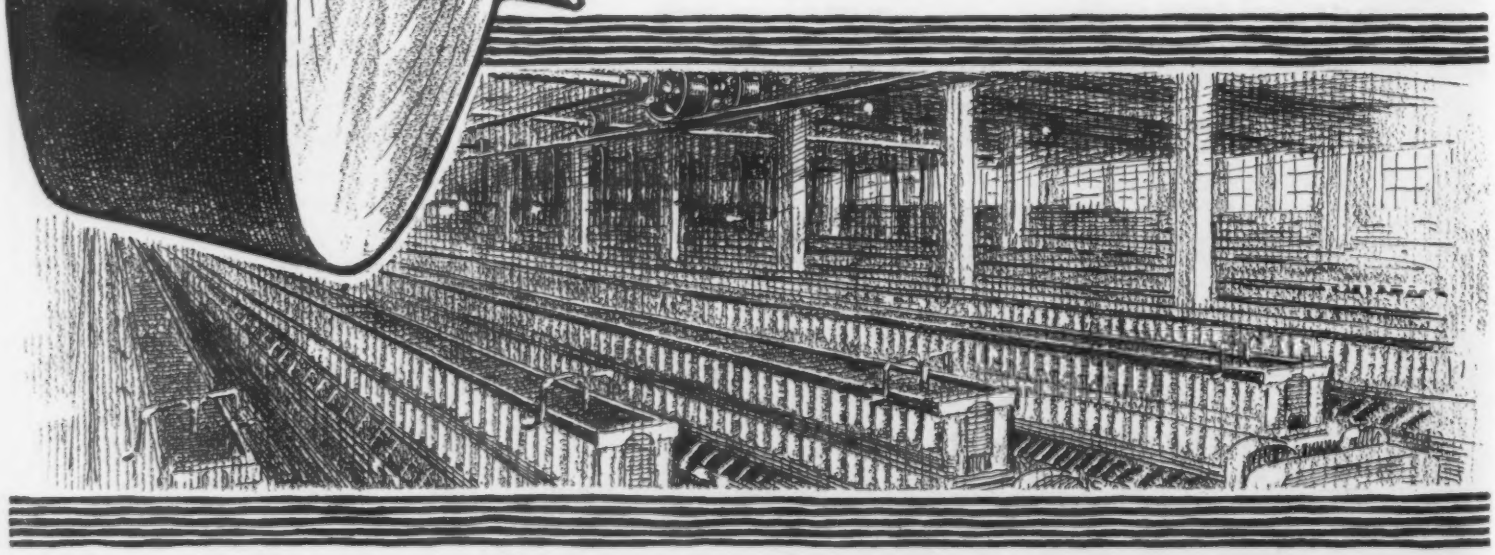
Los Angeles
San Francisco
Seattle, Wash.
Portland, Ore.



BUYERS INDEX

This department is conducted for the benefit of our subscribers. The addresses of builders of mill machinery and dealers in mill supplies, whose names appear in the following classified index, may be found upon referring to their advertisements. The Alphabetical Index to Advertisers follows the classified list.

Buyers who are unable to find in the classification here given such machinery or supplies as they desire, are invited to communicate with the publishers, who can, in all probability, refer them to proper sources. Advertisers whose names do not appear under headings to which they are entitled will please notify the publishers.

Absorbent Cotton Wool Machinery.
Saco-Lowell Shops.
Smith & Furbush Machine Co.
Tatham, William, Ltd.

Adding & Calculating Machines.
——See Calculating Machinery.

Agitators (Acid Proof).
Duriron Castings Co.

Air Washers and Coolers.
——See Humidifying.

Alkalies.
Solvay Process Co.
Wing & Evans.

Architects and Mill Engineers.
Arnold Co., The.
Cramer, Stuart W.
Day & Zimmerman.
Dyer, W. E. S.
Prather, H. B.
Lewis, Warren B.
Main, Charles T.
Peuckert & Wunder Co.
Scofield Engineering Co.
Sirrine, J. E.
Webster, Howard J.

Ash Handling Equipment.
American Steam Conveyor Corp.
Beaumont, R. H. Co.
Green Engineering Co.
Hunt Co., C. W.
Link-Belt Company.
Mercury Mfg. Co.
Sturtevant, B. F., Co.

Asphalt Tanks.
Scaife, W. B., & Sons.

Auditors and Accountants.
Cooley & Marvin Co.

Auctioneers.
Conant, J. E., & Co.

Automatic Feeds for Cotton and Wool.
Curtis & Marble Mach. Co.
Harwood & Son, Geo. S.
Hunter Machine Co., James.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Schofield, Wm., Co.
Smith & Furbush Machine Co.
Tatham, William, Ltd.
Woonsocket Mach. & Press Co.

Backwashers.
Sargent's Sons Corp., C. G.

Bale Ties.
Signode System, Inc.

Baling Presses.
——See Presses, Baling.

Ballers.
Saco-Lowell Shops.

Ball Bearings.
Bound Brook Oil-less Bearing Co.
Hubbard Machine Co.
New Departure Mfg. Co.
SKF Ball Bearing Co.
Transmission Ball Bearing Co.

Banding Machinery, Automatic.
Easton & Burnham Machine Co.

Bankers.
Dommerich & Co., L. F.
Merchants Nat. Bank.
Remy, Schmidt & Pleissner.

Baskets.
Diamond State Fibre Co.
Hardy, Frank H.
Lane & Bro., W. T.
Leatheroid Mfg. Co.
Morris & Co.
Standard Fibre Co.

Beaming & Warping Machinery.
Altemus, J. K.
Cocker Machine & Foundry Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Entwistle, T. C., Co.
Lever, Oswald, Co.
Mossberg Co., Frank.
Saco-Lowell Shops.
Smith & Furbush Machine Co.
Warp Compressing Mach. Co.

Belting.
Chicago Belting Co.
Foulds & Son, Inc., I.
Goodyear Tire & Rubber Co.
Graton & Knight Mfg. Co.
Houghton & Co., E. F.
Ladew Co., Inc., Edw. R.
Quinn, W. J., & Co.
Rhoads & Sons, J E.
Schieren, Chas. A., Co.
Stanley Belting Co.
Ulmer Leather Co.
Williams, I. B. & Sons.
——See also Mill Supplies.

Belting, Link.
Link-Belt Company.

Belt Cement.
Graton & Knight Mfg. Co.
Ladew, E. R., Co.
Quinn, W. J., & Co.
Rhoads & Sons, J. E.
Schieren, Chas. A., Co.
Ulmer Leather Co.
Williams & Sons, I. B.

Belt Dressing.
Dixon Crucible Co.
Graton & Knight Mfg. Co.
Ladew, E. R., Co.
Rhoads & Sons, J. E.
Schieren, Chas. A., Co.
Stephenson Mfg. Co.
Ulmer Leather Co.
Williams & Sons, I. B.

Belt Lacers.
Clipper Belt Lacer Co.

Belt Lacing, Leather.
Graton & Knight Mfg. Co.
Ladew, E. R., Co.
Rhoads & Sons, J. E.
Schieren, Chas. A., Co.
Williams & Sons, I. B.

Belt Tighteners.
Hunter, James, Machine Co.
Link-Belt Company.

Bindings.
——See Tapes and Braids.

Bleachers.
——See Dyers, Bleachers and Finishers.

Bleaching Kiers.
Allen Sons Co., Wm.
Butterworth, H. W., & Sons Co.
Dillon Boiler Works.
Jefferson, E. D.
New England Tank & Tower Co.
Phila. Drying Machinery Co.
Stearns Lumber Co., A. T.
Textile-Finishing Machinery Co.
Worcester Steam Boiler Works.

Bleaching Materials.
American Diamalt Co.
American Dyewood Co.
Andreykovicz & Dunk.
Arnold, Hoffman & Co.
Bannon & Co., W. H.
Bosson & Lane.
Cone, Frederick H.
Electric Smelting & Alum. Co.
Electro Bleaching Gas Co.
Ford Co., J. B.
Malt Diastase Co.
Marden, Orth & Hastings Corp.
National Aniline & Chemical Co.
Niagara Alkali Co.
Seydel Mfg. Co., The.
Southern Chemical Laboratory.
Wolf, Jacques & Co.
Worden Chemical Works.

Blowers and Blower Systems.
American Blower Co.
Buffalo Forge Co.
Carrier Air Conditioning Corp.
Phila. Drying Machinery Co.
Sturtevant, B. F., Co.
Wing Mfg. Co., L. J.

Boards (Winding).
Chaffee Bros. Co.
Pearson, J. T.
Richardson Bros.

Bobbin Holders.
Murdock & Geb. Co.

Bobbins, Spools, Shuttles, etc.
Tebbets, E. L., Spool Co.
Williams, J. H., Co.

Boilers.
Biggs Boiler Works.
Casey-Hedges Co.
Dillon Boiler Works.
Erie City Iron Works.
Scaife & Sons, W. B.

Boiler Settings.
Casey-Hedges Co.
Engineer Co.
Quigley Furnace Specialties Co.
Tropical Paint & Oil Co.

Boiler Tube Cleaner.
Huyette Co., Paul B.

Boxes, Box Shooks, etc.
American Vulcanized Fibre Co.
Chaffee Bros. Co.
Diamond State Fibre Co.
Fibre Specialty Mfg. Co.
Hinde & Dauch Paper Co.
Leatheroid Mfg. Co.
Pearson, J. T.
Standard Fibre Co.

Braiding Machinery.
Era Narrow Fabric Co.
Franklin Machine Co., Inc.
New England Butt Co.
Reynolds, Jr., Wm.
Textile Machine Works.

Braids.
——See Tapes, Braids, Edgings.

Brushes.
Curtis & Marble Machine Co.
Hardy, Frank H.
Mason Brush Works.
Parks & Woolson Machine Co.

Brushing Machines.
Curtis & Marble Machine Co.
Parks & Woolson Machine Co.

Burr Pickers.
Curtis & Marble Machine Co.
Sargent's Sons Corp., C. G.
Smith & Furbush Machine Co.

Button Sewing Machines.
Osann Co., Frederick.

Calculating Machines.
Comptometer Co.
Moore Calculating Co.

Calender Rolls.
Butterworth & Sons Co., H. W.
Perkins & Son, Inc., B. F.
Textile Finishing Machinery Co.

Carbonizing Machinery.
Hunter Machine Co., James.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Sargent's Sons Corp., C. G.
Textile Finishing Machinery Co.
Tolhurst Machine Works.

Carbonizing Rolls.
——See Rolls.

Card Clothing.
Ashworth Bros.
Atkinson, Haserick & Co.
Firth, Wm.

Card Grinding Machinery.
Atkinson, Haserick & Co.
Entwistle, T. C., Co.
Firth, Wm.
Hubbard Machine Co.
Roy & Son Co., B. S.
Smith & Furbush Machine Co.

Card Leather.
Graton & Knight Mfg. Co.

Card Stampers and Repeaters.
Hodgson, Walter W.

Carrier Aprons.
Graton & Knight Mfg. Co.
Link-Belt Company.

Cases, Packing.
——See Boxes, Box Shooks, etc.

Castings (Acid Resisting).
Duriron Castings Co.

Castings (Iron).
Cast Iron Pipe Pub. Bur.
Franklin Machine Co., Inc.
Lunkenheimer Co.
Powell Co., Wm.
Royersford Foundry & Mach. Co.

Caustic Soda.
Cone, Frederick H.
Marden, Orth & Hastings Corp.
Niagara Alkali Co.
Solvay Process Co.
Wing & Evans.

Chain Belts and Drives.
Abell-Howe Co.
American High Speed Chain Co.
Link-Belt Company.
Morse Chain Co.

Chemists.
Little, Arthur D., Inc.
Lunkenheimer Co., The.
U. S. Conditioning & Testing Co.

Chemical Apparatus.
Duriron Castings Co.
Economy Fuse & Mfg. Co.
Lummus Co., Walter E.

Chenille Machinery.
Eppler, John, Machine Works.

Chimneys.
——See Stacks.

Clocks.
Howard Clock Co.
Newman Clock Co.

Cloth Boards.
Chaffee Bros. Co.
Pearson, J. T.
Richardson Brothers.

Cloth Cutting Machines.
——See Cutting Machines.

Cloth Expander.
Leyland, Thos., & Co.

Cloth Guiders.
Butterworth & Sons Co., H. W.
Leyland, Thos., & Co.
Schwartz & Co., L. H. A.
Textile Finishing Machinery Co.

Cloth Shrinkage Machinery.
Reliance Machine Works.

Cloth Testers.
Perkins, B. F., & Sons, Inc.
Suter, Alfred.

Cloth Winders and Doublers.
Curtis & Marble Machine Co.
Parks & Woolson Machine Co.
Windle, J. E.

Clutches.
Caldwell Co., W. E.
Hilliard Clutch & Machy. Co.
Hunter, James, Machine Co.
Link-Belt Company.

Coal Handling Machinery & Storage Systems.
Beaumont, R. H., Co.
Byers Mach. Co., John F.
Coaling Plant Construction Co.
Hunt Co., C. W.
Industrial Works.
Link-Belt Company.
Mercury Mfg. Co.

Cocks (Acid Proof).
Duriron Castings Co.

Comb Aprons.
Foulds & Sons, Inc.
Graton & Knight Mfg. Co.

Combs (Wool and Cotton).
Atkinson, Haserick & Co.
Crompton & Knowles Loom Wks.
Entwistle Co., T. C.
Hood Co., R. H.
Loom Reed & Harness Co.
Speed & Stephenson.

Commission Merchants and Selling Agents.
(Cotton Goods.)
Bliss Fabyan & Co.
Catlin & Co.
Collins, Clarence L., & Co.
Converse, Stanton & Co.
Cone Export & Commission Co.
Deering, Milliken & Co.
Dommerich & Co., L. F.
Hunter Mfg. & Com. Co.
Lane, J. H., & Co.
Lawrence & Co.
Mitchell Co., James E.
Putnam, Hooker & Co.
Minot Hooper & Co.
Remy, Schmidt & Pleissner.
Seaboard Mills.
Sheridan & Co., G. K.
Stevens & Co., J. P.
Taylor, Clapp & Beall.
Turner, J. Spencer Co.
Watts, Stebbins & Co.
Wellington, Sears & Co.
Whitman, Clarence & Co., Inc.
Whitman Co., Inc., Wm.
Wilson, Jas. L., & Co
Woodward, Baldwin & Co.
(Knit Goods.)
Converse Stanton & Co.
(Woolen and Worsted.)
Allen, Ethan.
Bachman, L. & Co.
Converse, Stanton & Co.
Deering, Milliken & Co.
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Duval & Co., W. H.
Metcalf Bros. & Co.
Parker, Wilder & Co.
Sanford & Russell.
Stevens & Co., J. P.
Stursburg, Schell & Co., W.
Whitman Co., Inc., Wm.

Compressors Air).
Allis-Chalmers Mfg. Co.
General Electric Co.
Goulds Mfg. Co.
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Concrete Construction.
Trussed Concrete Steel Co.

Condensers.
Allis-Chalmers Mfg. Co.
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U. S. Conditioning & Testing Co.

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American Moistening Co.
Cramer, Stuart W.
Emerson Apparatus Co.
Parks & Woolson Machine Co.
Phila. Drying Machinery Co.
Sargent's Sons Corp., C. O.
Suter, Alfred.

Cones (Paper).
Fairpoint Corporation.

Contractors.
——See Mill Builders.

Controllers, Motor.
Electric Controller & Mfg. Co.

Conveying Systems.
American Steam Conveyor Corp.
Buffalo Forge Co.
Hunt Co., C. W., Inc.
Matthews Gravity Carrier Co.
Mercury Mfg. Co.
Link-Belt Company.
Sturtevant, B. F., Co.

Conveyor Belting.
Link-Belt Company.

Coolers (Air).
——See Humidifying Apparatus.

Copper Print Rollers.
Taunton-New Bedford Copper Co.

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Badger, E. B., & Sons Co.
Butterworth, H. W., & Sons Co.
Textile Finishing Machinery Co.

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Cork Insert Co.

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Scaife, W. B., & Sons.

Cotton.
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Gordon & Co., Inc.
Nuzum, H. F.
Van Leer & Co.

Cotton Machinery.
Ashworth Bros.
Atkinson, Haserick & Co.
Barber-Colman Co.
Butterworth, H. W., & Sons Co.
Cramer, Stuart W.
Crompton & Knowles Loom Wks.
Curtis & Marble Machine Co.
Dixon Lubricating Saddle Co.
Draper Corporation.
Easton & Burnham Machine Co.
Elliot & Hall.
Entwistle Co., T. C.
Firth, Wm.
Houghton, L. T.
Hunter Machine Co.
Lever Co., Inc., Oswald.
Leyland, Thos., & Co.
Mason Machine Works.
Metallic Drawing Roll Co., The.
Parks & Woolson Machine Co.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Roy & Son Co., B. S.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Schwartz, L. H. A., & Co.
Smith & Furbush Machine Co.
Stafford Co., The.
Tatham, William, Ltd.
Textile Finishing Machinery Co.
Universal Winding Co.
Westaway, W. J.
Whitinsville Spinning Ring Co.
Woonsocket Mach. & Press Co.

Cotton Openers and Lappers.
Atkinson, Haserick & Co.
Firth, Wm.
Saco-Lowell Shops.
Woonsocket Mach. & Press Co.

Cotton Softeners.
Bosson & Lane.
Harding & Fancourt, Inc.
McMeekan Mfg. Co., David.
Houghton, E. F., & Co.
Leyland, Thos., & Co.
Quaker City Chemical Co.
Seydel Mfg. Co., The.
Southern Chemical Laboratory.
Wolf, Jacques, & Co.
Zurn, O. F., Co.

Cotton Waste.
Valley Waste Mills.

Cotton Waste Machinery.
Firth, Wm.
Saco-Lowell Shops.
Smith & Furbush Machine Co.
Tatham, William, Ltd.

Counting Machines.
Durant Manufacturing Co.
National Scale Co.
Root, C. J. & Co.
Veeder Mfg. Co.

Couplings (Shaft).
Royersford Foundry & Mach. Co.
Sellers & Co., Wm.

Cranes.
Byers Machine Co., John F.
Industrial Works.

Crayons.
American Crayon Co.
Binney & Smith Co.
Dixon Crucible Co.
Howe Mill Crayon Co.
Lowell Crayon Co.

Cutting Machines.
Cameron Machine Co.
Eastman Machine Co.
Grand Rapids Tex. Machy. Co.
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Barrett Co.
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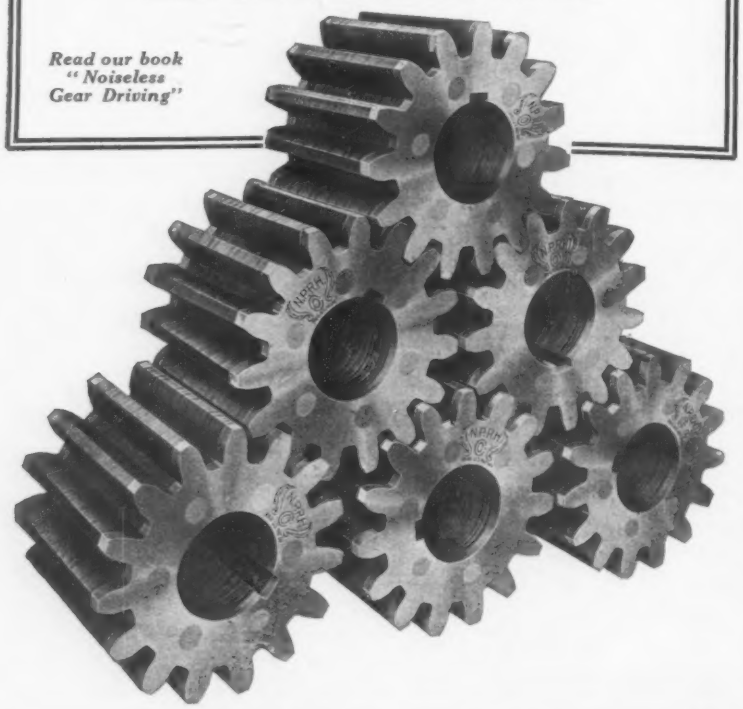

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Why doesn't the firm appreciate your merit?

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But you did say. "Blame sight rather have an old hand power elevator with a hemp rope to hang on than that confounded electric!"

Why don't you discover the Ridgway Steam Hydraulic and put a feather in your cap by taking him out from under the Elevator Curse.

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——See Rolls.

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——See Wool and Waste Dusters.

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Franklin Process Co.
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Hunt, Rodney, Machine Co.
Hunter, James, Machine Co.
Hussong Dyeing Machine Co.
Kenyon, D. R., & Son.
Klauder-Weldon Dyeing Mach. Co.
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Phila. Textile Machinery Co.
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Roy & Son Co., B. S.
Salem Iron Works.
Sargent's Sons Corp., C. G.
Smith, Drum & Co.
Sturtevant, B. F., Co. (Drying).
Suter, Alfred.
Tait, G. W.
Textile Finishing Machinery Co.
Tolhurst Machine Works.

Dye House Cans.
Diamond State Fibre Co.
Hill, James, Mfg. Co.
Standard Fibre Co.

Dye House Trucks.
——See Trucks.

Dye Sticks.
Bailey, Frank.
New England Tank & Tower Co.

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Andreykovicz & Dunk.
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Bernard, B.
Bick & Undy.
Binney & Smith Co.
Bischoff & Co.
Bosson & Lane.
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Campbell & Co., John.
Cone, Frederick H., & Co.
Coyne, Geo. S.
Cronkite Co.
Davis, James W.
Delta Chemical Co.
Drake & Co.
Dunker & Perkins.
Du Pont de Nemours & Co.
Dye Exchange Corporation.
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Fergusson, Jr., A. C.
Ford Co., J. B.
Franco-American Dye Works.
Geisenheimer & Co.
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Grasselli Chemical Co.
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Jackson & Co., Ellis.
Jennings & Co.
Jordan, W. H. & F., Jr.
Klipstein & Co., A.
Koaltar Color Co.
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Korth Aniline Co
Kuttroff, Pickhardt & Co.
Madero Bros., Inc.
Malt Diastase Co.
Marden, Orth & Hastings Co.
Maryland Chemical Co.
Metz & Co., H. A.
Miller, Joseph B.
National Aniline & Chemical Co.
Newport Chemical Works.
Niagara Alkali Co.
Nichols Copper Co.
Northern Color Co.
Olson Co., J. P.
Onyx Oil & Chemical Co.
Quaker City Supply Co.
Radcliffe Color & Chemical Wks.
Republic Trading Co.
Rub-No-More Co.
Seydel Mfg. Co.
Sherwin-Williams Co.
Sizing Specialties Co.
Smith Color Co., J. R.
Solvay Process Co.
Standard Chem. & Metals Corp.
Standard Color Co.
Stein, Hall & Co.
Sterling Color Co.
Swiss Products Co.
Thayer, Ed. M., & Co.
United Chem. Products Corp.
United Supply Co.
U. S. Color & Chemical Co.
Vila Color Co., H. S.
Vila, Jos. S.
Warren Aniline Co.
Warren Products Co., Inc.
Wernick, Harry C.
Wetzel & Co., Fred S.
Widder Dye & Chemical Co.
Williamsburg Chemical Co.
Wing & Evans, Inc.
Wolf, Jacques & Co.
Worden Chemical Works.
Young & Co., J. S.
Zobel Color Works.

Dynamos.
——See Electric Lighting.

Economizers.
——See Fuel Economizers.

Edgings.
——See Tapes, Braids and Edgings.

Electric Cloth Cutters.
Eastman Machine Co.

Electrical Construction.
Allis-Chalmers Mfg. Co.
Crocker-Wheeler Co.
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Sturtevant, B. F., Co.
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General Electric Co.

Electric Fans.
Allis-Chalmers Mfg. Co.
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Buffalo Forge Co.
Crocker-Wheeler Co.
General Electric Co.
Perkins & Son, Inc., B. F.
Phila. Drying Machinery Co.
Phila. Textile Machinery Co.
Sturtevant, B. F., Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Wing Mfg. Co., L. J.

Electric Hoists.
Allis-Chalmers Mfg. Co.
Crocker-Wheeler Co.
General Electric Co.
Link-Belt Company.

Electric Lamps.
——See Lamps, Electric.

Electric Lighting.
Allis-Chalmers Mfg. Co.
Benjamin Electric Mfg. Co.
Cooper Hewitt Electric Co.
Crocker-Wheeler Co.
Crouse-Hinds Co.
Cutter Co., Geo.
General Electric Co.
Luminous Specialty Co.
National X Ray Reflector Co.
Sturtevant, B. F., Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.
Westinghouse Lamp Co.

Electric Motors.
Allis-Chalmers Mfg. Co.
General Electric Co.
Crocker-Wheeler Co.
Howell Electric Motors Co.
Sturtevant, B. F., Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.

Electric Power Control Appliances.
Crouse-Hinds Co.

Elevators.
Economy Engineering Co.
Link-Belt Company.
N. Y. Revolving Portable Elev. Co.
Ridgway & Son Corp., Craig.
Salem Eelevator Works.

Elevators, Revolving Portable.
——See Portable Elevators.

Engineers, Mill.
——See Architects and Mill Engineers.

Engineers (Ventilating).
Cramer, Stuart W.
Spray Engineering Co.
Sturtevant, B. F., Co.
Wing Mfg. Co., L. J.

Engineers, Research.
Abbott, W. G.

Engines (Steam, Oil, Gas).
Ajax Fire Engine Works.
Allis-Chalmers Co.
American Blower Co.
Ball Engine Co.
Buffalo Forge Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.

Engraving (Photo).
Gatchel & Manning.

Exhaust Fans.
——See Ventilating Apparatus.

Exhaust Heads.
Power Specialty Co.
Sturtevant, B. F., Co.

Extractors.
American Laundry Machy. Co.
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Atkinson, Haserick & Co.
Schaum & Uhlinger, Inc.
Schwartz, L. H. A., & Co.
Tolhurst Machine Works.

Factories and Factory Sites.
Chew, David S. B.

Feed Water Heaters.
National Pipe Bending Co.
Scaife, W. B., & Sons.

Feed Water Pumps.
Buffalo Steam Pump Co.
Goulds Mfg. Co.

Feed Water Purifiers.
American Water Softener Co. of Philadelphia.
Permutit Co.
Refinite Co.
Scaife, W. B., & Sons.

Feed Water Regulators.
Northern Equipment Co.
Wing Mfg. Co., L. J.

Felting Machinery.
Hunt, Rodney, Machine Co.
Kenyon & Son, D. R.

Fences, Wire (Iron).
Anchor Post Iron Works.
Cyclone Fence Co.
Page Steel & Wire Co.
Stewart Iron Works Co.
Wright Wire Co.

Fibre Boxes and Trucks.
Diamond State Fibre Co.
Fibre Specialty Mfg. Co.
Standard Fibre Co.

Filters, Water.
——See Purifying and Filtration Plants.

Financial.
Lachenbruch & Co., Morton.
Law & Co., A. M.

Finishing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Fire Brick.
Borgner, Cyrus, Co.

Fire Hydrants.
Norwood Engineering Co.

Flax and Jute Machinery.
Haskell Dawes Mach. Co.
Smith & Furbush Mach. Co.

Flood Light Projectors.
Crouse-Hinds Co.

Flow Meters.
General Electric Co.
Republic Flow Meter Co.
Spray Engineering Co.

Fluted Rolls.
Firth, William.
Metallic Drawing Roll Co.

Flyer Pressers and Overhaulers.
Southern Spindle & Flyer Co.

Flyers.
Bodden, Wm., & Son, Ltd.
Firth, William.
Southern Spindle & Flyer Co.

Forges.
Buffalo Forge Co.
Sturtevant, B. F., Co.

Friction Clutches.
——See Clutches.

Fuel Economizers.
Precision Instrument Co.
Sturtevant, B. F., Co.

Fulling Mills for Woolen Goods.
American Laundry Machy. Co.
Hunt, Rodney, Machine Co.
Hunter, James, Machine Co.
Kenyon, D. R., & Sons.

Fulling Rolls.
Hunt, Rodney, Mach. Co.

Fuses.
Economy Fuse & Mfg. Co.

Garnetts.
Hunter, James, Machine Co.
Smith & Furbush Machine Co.

Gas Blowers and Exhausters.
American Blower Co.
Sturtevant, B. F., Co.

Gas Engines.
——See Engines.

Gas Systems.
Kemp Mfg. Co.

Gaskets (Superheated Steam).
Power Specialty Co.

Gauges.
Lunkenheimer Co., The.
Powell Co., William.
Precision Instrument Co.

Gears.
Albaugh-Dover Co.
American Vulcanized Fibre Co.
Diamond State Fibre Co.
Ganschow Co., Wm.
General Electric Co.
New Process Gear Corporation.
Philadelphia Gear Works.

Gears, Rawhide.
Ganschow Co., Wm.
New Process Gear Corporation.

Gear Cutting Machines.
Whiton, The, D. E., Co.

Gearing, Silent Flexible.
Link-Belt Company.
Morse Chain Co.

Generating Sets.
Allis-Chalmers Mfg. Co.
General Electric Co.
Sturtevant, B. F., Co.
Westinghouse Elec. & Mfg. Co.

Geyser Water Heater.
Sargent's Sons, C. G., Corp.

Grab Buckets.
Link-Belt Company.

Graphite Boiler.
Dixon Crucible Co., Joseph.

Grate Bars.
Canton Grate Co.
Dillon Boiler Works.
Thomas Grate Bar Co.
Valley Iron Works.

Grease Cups.
Powell Co., Wm.

Greases.
Borne, Scrymser Co.
Crew Levick Co.
N. Y. & N. J. Lubricant Co.
Royersford Foundry & Mach. Co.

Grinding and Polishing Machines.
Roy & Son Co., B. S.
Royersford Foundry & Mach. Co.

Guides, Thread.
Mitchell-Bissell Co.
Palmer & Co., I. E.

Gun Cotton Machinery.
Phila. Drying Machinery Co.
Tatham, William, Ltd.

Harness, Twine.
Crompton & Knowles Loom Wks.
Garland Mfg. Co.
Moore, C., & Co.

Harness and Frames.
——See Heddles and Frames.

Heating.
——See Ventilating Apparatus.

Heddles and Frames.
Atkinson, Haserick & Co.
Firth, William, Co.
Garland Mfg. Co.
Gowdey Reed & Harness Mfg. Co., J. A.
Loom Reed & Harness Co.
Steel Heddle Mfg. Co.
Walker Mfg. Co.
Williams, J. H. Co.

Hose, Fire, Steam, Water.
Goodyear Tire & Rubber Co.

Hose, Pneumatic.
Parks, G. M., Co.

Hosiery Boards.
Paramount Hos'y Form Dry'g Co.
Pearson, J. T.
Phila. Drying Machinery Co.

Hotels.
Hotel Bancroft.
Hotel Martinique.

Humidifying and Air Conditioning Apparatus.
American Blower Co.
American Moistening Co.
Carrier Engineering Corporation.
Cramer, Stuart W.
Parks Co., The, G. M.
Spray Engineering Co.

Humidity Controller.
American Blower Co.
American Moistening Co.
Carrier Engineering Corporation.
Cramer, Stuart W.
Parks Co., The, G. M.

Hydro Extractors.
——See Extractors.

Insulating and Braiding Silks.
Sauquoit Silk Mfg. Co.

Intake Screen, Traveling.
Link-Belt Company.

Jacquards.
Crompton & Knowles Loom Wks.
Halton's, Thomas, Sons.

Jacquard Cards.
Merwin Paper Co.

Kettles, Steam Jacketed.
——See Steam Jacket Kettles.

Kiers.
——See Bleaching Kiers.

Knit Goods, Edgings, Trimmings, Etc.
Cheney Bros.
Krout & Fite Mfg. Co.
Weimar Bros.

Knit Goods, Finishing Machines, Crochet, Etc.
Grand Rapids Textile Mach. Co.
Hunt, Rodney, Machine Co.
Merrow Machine Co., The.
National Marking Machine Co.
Scott & Williams.
Spindler, E. O.
Union Special Machine Co.
Willcox & Gibbs Sewing Mch. Co.

Knitting Machine Cylinders.
Paxton & O'Neill.
Stafford & Holt.

Knitting Machinery.
Acme Knitting Mch. & Needle Co.
Brinton, H., & Co.
Cooper's Mach. & Needle Works.
Crane Mfg. Co.
Dubied Machinery Co.
Eppler, John, Machine Works.
General Machine Works.
Gormly, Robert.
Hemphill Mfg. Co.
Jenckes Knitting Mach. Co.
Johnson Knitting Mach. Co.
Lamb Knitting Machine Co.
Leighton Machine Co.
Paxton & O'Neill.
Richter Machine Co.
Scott & Williams, Inc.
Spindler, E. O.
Stafford & Holt.
Textile Machine Works.
Tompkins Bros. Co.
Westanay, W. J.
Wildman Mfg. Co.
Wildt & Co.

Knitting Machinery (Full Fashioned).
Lamb Knitting Machine Co.
Richter Machine Co.
Spindler, E. O.
Textile Machine Works.

Knitting Needles and Supplies.
Acme Knitting Mch. & Needle Co.
Breedon's Wm., Sons.
Brinton, H., & Co.
Continental Latch Needle Co.
Cooper's Mach. & Needle Works.
Crane Mfg. Co.
Ives, L. T., Co.
Lamb Knitting Machine Co.
Nat. Knit Goods Sup. Co.
Torrington Co., The.

Knotters.
Barber-Colman Co.

Label Sewing Machine.
National Marking Mach. Co.

Label Pasting Machine.
Jasper, E. W. S.

Label Wire Stitchers.
Hardenbrook C. E., Co.
Shoemaker, J. L., & Co.

Lace Leather.
——See Belt Lacing Leather.

Lamps, Electric.
Cooper-Hewitt Electric Co.
Crouse-Hinds Co.
General Electric Co.
Luminous Specialty Co.
Westinghouse Elec. & Mfg. Co.
Westinghouse Lamp Co.

Lamps, Vapor.
Cooper-Hewitt Electric Co.

Laundry Machinery.
American Laundry Machy. Co.
American Wringer Co.

Leather.
Foulds, L., & Son.
Quinn, W. J., & Co.

Liquid Chlorine.
Electro Bleaching Gas Co.

Loom Harness.
Garland Mfg. Co.
Graton & Knight Mfg. Co.
Loom Reed & Harness Co.
Steel Heddle Mfg. Co.

Loom Pickers.
Garland Mfg. Co.
Graton & Knight Mfg. Co.

Looms.
Atkinson, Haserick & Co.
Crompton & Knowles Loom Wks.
Draper Corporation.
Mason Machine Works.
Saco-Lowell Shops.
Speed & Stephenson.
Stafford Co., The.

Loopers.
Hepworth, John W., & Co.
Leighton Machine Co.

Lubricants.
Borne, Scrymser Co.
Crew Levick Co.
N. Y. & N. J. Lubricant Co.
Royersford Foundry & Mach. Co.
SKF Ball Bearing Co.
Swan & Finch Co.

Lubricators.
Lunkenheimer Co.
Powell Co., Wm.

Lug Straps.
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.

Lumpers.
Dodge, C. S. (and Willowers).
Schofield, William, Co.

Machinists' Tools.
Whiton, The D. E., Co.

Mangles.
American Laundry Machy. Co.
Butterworth & Sons Co., H. W.

Manufacturers.
(Cotton).
Amoskeag Mfg. Co.
Esmond Mills.
Hamilton Mfg. Co.
Lancaster Mills.
Loray Mills.
Naumkeag Steam Cotton Co.
Pacific Mills.
Parkhill Mfg. Co.
Roanoke Mills Co.
Whitman Co., Inc., Wm.
Windsor Print Works.
(Knit).
Atlas Underwear Co.
Black Cat Textiles Co.
Northwestern Knitting Co.
Piqua Hosiery Co.
(Wool).
Aetna Mills.
American Woolen Co.
Amoskeag Mfg. Co.
Arlington Mills.
Blumenthal, Sidney, & Co.
Cleveland Woolen Co.
Coronet Worsted Mills.
Dunn Worsted Mills.
Firth & Foster Co.
Fletcher, Jos. E.
Goff & Sons, D.
Hamilton Woolen Co.
Hockanum Association.
Hetzel, Geo. C., Co.
Kent Mfg. Co.
Leominster Worsted Co.
Pacific Mills.
Peacedale Mfg. Co.
Perseverance Worsted Mills.
Shirreffs Worsted Co.
Talbot Mills.
U. S. Worsted Co.

Mattress Machinery.
Dodge, C. S.
Hunter Machine Co., James.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliot & Hall.
Parks & Woolson Machine Co.
Smith, Wm., & Sons.
Windle, J. E.

Mechanical Draft.
American Blower Co.
Engineer Co.
Buffalo Forge Co.
Buffalo Steam Pump Co.
Hahn, Eugene.
Sturtevant, B. F., Co.
Wing Mfg. Co., L. J.

Mechanical Engineers.
Abbott, W. G.
American Blower Co.
Buffalo Forge Co.
Phila. Drying Machinery Co.
Sturtevant, B. F., Co.

Mechanical Rolls.
American Wringer Co.

Mercerizers.
Aberfoyle Mfg. Co.
Cooper, Gerald.
Ewing-Thomas Converting Co.
Globe Dye Works.
Home Bleach & Dye Works.
Mansfield Bleachery.
Montgomery Co., J. R.
Peech Sons & Phillips Co.
R. I. Processing Co.
Solway Dyeing & Textile Co.
Standard Processing Co.

Mercerizing Machinery.
Butterworth, H. W., & Sons Co.
Schwartz, L. H. A., & Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.

Metal Laths and Partitions.
Lupton's Sons Co., David.
Trussed Concrete Steel Co.

Metallic Packing.
Power Specialty Co.

Metallic Rolls.
Metallic Drawing Roll Co.

Meters, Flow-Air, Gas, Water.
General Electric Co.
Republic Flow Meters Co.

Mill Architects.
——See Architects and Mill Engineers.

Mill Builders.
Arnold Co., The.
Casper Ranger Construction Co.
Crowell-Lundoff-Little Co.
Ferguson Co., John W.
Fiske-Carter Construction Co.
New England Concrete Construction Co.
Trussed Concrete Steel Co.
Turner Construction Co.

Mill Supplies.
Bamford & Smith.
Bell, Harry E.
Benjamin, Morris.
Bound Brook Oil-less Bearing Co.
Buckley's, Benjamin, Sons.
Cordley & Hayes.
Dixon Crucible Co.
Dixon Lubricating Saddle Co.
Easton & Burnham Machine Co.
Firth, William.
Foulds & Sons, Inc.
Garfield Machine Works.
Garland Mfg. Co.
Graton & Knight Mfg. Co.
Hall & Co., I. A.
Hardy, Frank H.
Howe Mill Crayon Co.
Lowe, S. C., Supply Co.
Lowell Crayon Co.
Lunkenheimer Co.
Pairpoint Corporation.
Palmer & Co., I. E.
Philadelphia Drying Machy. Co.
Powell, Wm., Co.
Rhoads & Sons, J. E.
Richardson Bros.
Standard Mill Supply Co.
Stephenson Mfg. Co.
Wetherell Bros. Co.
Williams & Sons, I. B.

Moth Exterminator.
Murray Co., Edgar A.

Motors.
——See Electric Motors.

Motor Trucks.
Kissel Motor Car Co.
Pierce-Arrow Car Co.
Service Motor Motor Truck Co.

Napping Machinery.
Curtis & Marble Machine Co.
Parks & Woolson Machine Co.
Schwartz, L. H. A., & Co.

Noils (Silk).
Ryle, Wm., & Co.

Non-Fluid Oil.
N. Y. & N. J. Lubricant Co.

Oil Cups.
Lunkenheimer Co.
Powell Co., Wm.

Oil-less Bearings.
Bound Brook Oil-less Bearing Co.

Oils.
Atlantic Refining Co.
Borne, Scrymser Co.
Cone, Frederick H. & Co.
Crew Levick Co.
Fancourt & Co., Inc., W. F.
Harding, Inc., H. C.
Huile Company.
Jordan, W. H. & F., Jr., Inc.
Leyland, Thos., & Co.
Magic Leather Treatment Co.
N. Y. & N. J. Lubricant Co.
Rub-No-More Co.
Seydel Mfg. Co.
Swan & Finch Co.
Ulco Oil Co.
Wolf, Jacques & Co.
Zurn, O. F., Co.

Oiling Systems.
Lunkenheimer Co.
Powell Co., Wm.

Packings (Leather).
Graton & Knight Mfg. Co.
Schieren Co., Chas. A.

Packings, Rubber.
Goodyear Tire & Rubber Co.

Paint Guns.
Spray Engineering Co.

Paints.
Arco Company.
Chaffee Co., Thos. K.
Chicago White Lead & Oil Co.
Dixon Crucible Co.
Lowe Bros. Co.
Patton Paint Co.
Tropical Paint & Oil Co.
U. S. Gutta Percha Paint Co.
U. S. Varnish Co.
Wadsworth, Howland Co.

Paper and Paper Boards.
Liberty Paper Co.
Merwin Paper Co.
Odell Mfg. Co.
Papco Paper Products Co.
Paper Manufacturers Co.
Richardson Bros.
Schoettle Paper Box Co.
Walter, S.

Paper Cones and Tubes.
Alpha Cone Co.
Consolidated Paper Tube Co.
National Paper Tube Co.
Pairpoint Corporation.
Philadelphia Cone Co.
Sinclair Cone Co.

Patent and Trade Mark Solicitors.
Crosby & Gregory.
Heard, Smith & Tennant.

Penstocks.
Hunt, Rodney, Machine Co.
Stearns Lumber Co., A. T.

Perforated Metal.
Allis-Chalmers Mfg. Co.
Beckley Perforating Co.

Picker Pins.
Dodge, C. S.

Pickers, Leather.
Foulds & Sons, Inc.
Garland Mfg. Co.
Graton & Knight Mfg. Co.

Pickers, Rag & Shoddy.
——See Rag Pickers.

Picker Sticks.
Garland Mfg. Co.

Picker Teeth.
Curtis & Marble Mach. Co.
Dodge, C. S.

Pipe Covering.
Magnesia Asso. of America.

Pipe and Fittings.
Cast Iron Pipe Pub. Bur.
Duriron Castings Co. (Acid Proof).
Parks, G. M., Co.
Scaife, W. B., & Sons.

Porcelain Guides.
Mitchell-Bissell Co.

Portable Buildings.
Pruden Co., C. D.
Trussed Concrete Steel Co.

Portable Elevators.
Economy Engineering Co.
Link-Belt Company.
N. Y. Revolving Portable Elev. Co.

Power Transmission Machinery.
Abell-Howe Co.
Allis-Chalmers Mfg. Co.
American High Speed Chain Co.
American Pulley Co.
Caldwell Co., W. E.
Cork Insert Co.
Cresson-Morris Co.
Dodge Sales & Engineering Co.
Fairmount Foundry Co.
Franklin Machine Co.
Ganschow Co., Wm.
General Electric Co.
Hilliard Clutch & Machy. Co.
Hunt, Rodney, Machine Co.
Hunter, James, Machine Co.
Jones & Laughlin Steel Co.
Lambeth Rope Corp.
Leffel, James, & Co.
Link-Belt Company.
Morse Chain Co. (Silent Chain)
Perkins, B. F., & Son, Inc.
Pyott Foundry Co.
Reeves Pulley Co.
Royersford Foundry & Mach. Co.
Schofield, William, & Co.
Sellers, Wm., & Co.
Smith, William, & Sons.
SKF Ball Bearing Co.
Tolhurst Machine Works.
Transmission Ball Bearing Co.
Western Electric Co.
Westinghouse Electric & Mfg. Co.

Preparatory Machinery (Cotton).
Draper Corporation.
Firth, William, Co.
Hunter Mach. Co., James.
Phila. Drying Machinery Co.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Machine Co.
Tatham, Limited, Wm.
Woonsocket Mach. & Press Co.

Preparatory Machinery (Wool and Worsted).
Curtis & Marble Mach. Co.
Butterworth & Sons, H. W.
Dodge, C. S.
Harwood & Son Co., George S.
Hunter Machine Co., James.
Phila. Drying Machinery Co.
Saco-Lowell Shops.
Sargent's Sons Corp., C. G.
Smith & Furbush Mach. Co.
Speed & Stephenson.
Tatham, Limited, Wm.
Textile Finishing Machinery Co.

Presses.
American Laundry Machinery Co.
Butterworth, H. W., & Sons Co.
Curtis & Marble Machine Co.
Dodge, C. S.
Phila. Drying Machinery Co.
Reliance Machine Works.
Saco-Lowell Shops.
Smith & Furbush Mach. Co.
Spence & Rideout.
Textile Finishing Machinery Co.
U. S. Hoffman Co.

Presses, (Baling).
Economy Baler Co.
Garrett & Co., Sylvester S.
Klein Co., H. J.
Sullivan Machinery Co.

Presses (Drill and Punch).
Royersford Foundry & Machine Co. (also Trimming Presses).

Press Boards and Papers.
Diamond State Fibre Co.
Merwin Paper Co.
Phila. Drying Machinery Co.
Richardson Brothers (Importers and Dealers).

Press Rolls.
Rodney Hunt Mach. Co.

Pulley Covering.
Graton & Knight Mfg. Co.
Williams & Sons, I. B.

Pulleys.
——See Power Transmission Machinery.

Pumps.
Allis-Chalmers Mfg. Co.
Buffalo Forge Co.
Buffalo Steam Pump Co.
Duriron Castings Co. (Acid Proof).
Goulds Mfg. Co.
Hunt, Rodney, Machine Co.
Phila. Drying Machinery Co.
Textile Finishing Machinery Co.

Pump Governors.
Fisher Governor Co.

Punches and Dyes.
Royersford Foundry & Mach. Co.

Purifying and Filtration Plants.
American Water Softener Co. of Philadelphia.
Hungerford & Terry.
N. Y. Continental Jewel Filtration Co.
Norwood Engineering Co.
Permutit Co.
Refinite Co.
Scaife, Wm. B., & Sons.

Quillers.
Foster Machine Co.
Payne, G. W., & Co.
Terrell Machine Co.
Universal Winding Co.

Rag Dealers.
American Wool Stock Co.
Cohen & Sons, B.
Frankel Brothers & Co.
Gordon Bros.
Rawitser & Co., S.
Salter & Sons, M.
Sherwin Wool Co.

Rag Pickers.
Curtis & Marble Mach. Co.
Dodge, C. S.
Schofield, Wm., Co.
Smith & Furbush Machine Co.
Tatham, Wiliam, Ltd.

Railways, Industrial.
Hunt Co., C. W., Inc.
Mercury Mfg. Co.

Raw Hide Gears.
New Process Gear Corporation.

Regulators.
Powers Regulator Co.
Fisher Governor Co.

Real Estate.
Chew, David S. B.

Ribbons.
Cheney Bros.
Macungie Silk Co.

Roller Bearings.
Royersford Foundry & Machine Co. (also Babbitted Ring Oiling).

Roller Coverings.
American Wringer Co. (Rubber).
Foulds & Sons, Inc.
Graton & Knight Mfg. Co.
Hood Co., R. H.

Rolls.
Rodney Hunt Mach. Co.
Southern Spindle & Flyer Co.

Roofing.
Barrett Co.

Rope Transmission.
Caldwell Co., W. E.
Cresson-Morris Co.
Hunt Co., C. W., Inc.
Hunter, James, Machine Co.
Lambeth Rope Corp.
Link-Belt Company.

Roving Cans.
American Vulcanized Fibre Co.
Cronkite Co.
Diamond State Fibre Co.
Fibre Specialty Mfg. Co.
Hill, James, Mfg. Co.
Leatheroid Mfg. Co.
Standard Fibre Co.

Rub Aprons.
Graton & Knight Mfg. Co.

Rubber Rolls.
American Wringer Co.
Rodney Hunt Machine Co.

Saddles.
Dixon Lubricating Saddle Co.

Saddle Cards.
Steinthal & Co., M.

Safety Devices.
Crouse-Hinds Co. (electric).
Johnson Sons Co., T. S.

Sanitary Equipment.
Kemp Mfg. Co., C. M.
Vogel Co., Joseph A.

Sanitary Fountains.
——See Drinking Fountains.

Sash Operators.
Drouve Co.
Lupton's Sons Co., David.

Scales.
American Kron Scale Co.
National Scale Co.
Standard Scale & Supply Co.
Torsion Balance Co.

Scallop Machines.
Merrow Machine Co.

Schappe (French Spun).
Suter, Alfred.

Schools.
Lowell Textile School.
New Bedford Textile School.

Second-Hand Machinery.
——See Clearing House Pages.
(Cotton).
Bullock Mach. Exchange.
Clark Machinery Co., J.
Diamond Textile & Mach. Works.
General Textile Machy. Co.
Jefferson, Edward.
Lamb Textile Machy. Co., J. K.
National Machinery Co.
Phelan, Quinn & Co.
Speed & Stephenson.
(Knit).
Cady, A. J.
Newton, Edwin A.
Smith Textile Machy. Co., Geo. E.
(Wool).
Armshire & Wheeler.
Brierly-Lombard Co.
Cady, A. J.
Healy, John J.
Jefferson, Edward.
Jefferson Machinery Co.
Lamb Textile Machy. Co., J. K.
National Machinery.
Philbrick, W. V. & C. H.
Smith Textile Machy. Co., Geo. E.
Watson, E. K.

Securities.
Lachenbruch, Morton & Co.

Separators.
Schaum & Uhlinger.

Separators (Yarn).
Draper Corporation.

Sewing Machines & Supplies.
Curtis & Marble Machine Co.
Dinsmore Mfg. Co.
Fales, L. F.
Leyland, Thos., & Co.
Merrow Machine Co.
Metropolitan Sewing Machine Co.
National Marking Mach. Co.
Smith & Sons, Wm.
Spindler, E. O.
Textile Finishing Machinery Co.
Tillinghast Sup. & Mach. Co.
Union Special Machine Co.
Willcox & Gibbs Sewing Mch. Co.

Shafting, Hangers, Etc.
——See Power Transmission Machinery.

Shafting Rings (Leather).
Graton & Knight Mfg. Co.
Rhoads & Sons, J. E.

Shearing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Shelving Steel.
Lupton's Sons Co., David.
National Scale Co.

Shoddy.
Atlantic Woolen Mills.
Gordon Bros.

Shoddy Pickers.
——See Rag Pickers.

Shuttles.
——See Bobbins, Spools, Shuttles, etc.

Silk Machinery.
Butterworth, H. W., & Sons Co.
Crompton & Knowles Loom Wks.
Curtis & Marble Mach. Co.
Mason Machine Works.
Parks & Woolson Mach. Co.
Schwartz, L. H. A., & Co.
Suter, Alfred.
Textile Finishing Machinery Co.

Silk Mill Supplies.
Hall, I. A., & Co.

Silks (Raw).
American Silk Spinning Co.
General Silk Importing Co.
Heineman, Oscar, Co.
Villa, A. P., & Bros.
For Silk Yarns, see Yarns, Threads, Etc.

Singe Plates.
Butterworth, H. W., Sons Co.
Taunton-New Bedford Copper Co.
Textile Finishing Machinery Co.

Singeing Machines.
Butterworth, H. W., Sons Co.
Curtis & Marble Machine Co.
Hussa, Theodore F.
Kemp Mfg. Co., C. M.
Phila. Drying Machinery Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.

Sizing, Starch and Gums.
American Diamalt Co.
Arnold Hoffman & Co.
Corn Products Refining Co.
Leyland, Thos. Co.
Malt-Diastase Co.
Morningstar, Chas. & Co., Inc.
Seydel Mfg. Co., The.
Sizing Specialties Co.
Stein, Hall & Co.
Wolf, Jacques & Co.
Worden Chemical Works.

Skylights.
Drouve Co., G.
Lupton's Sons Co., D.

Slashers and Equipment.
Saco-Lowell Shops.
Textile Finishing Machinery Co.

Soaps.
Cronkite Co.
Dobbins Soap Mfg. Co.
Draper, J. O., Co.
Dunker & Perkins.
Electric Smelt. & Alum. Co.
Fancourt & Co., W. F.
Harding, Inc., H. C.
Kenney Mfg. Co., F.
Rome Soap Co.
Seydel Mfg. Co., The.
Standard Soap Mfg. Co.
Warren 'Soap Mfg. Co.

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Easton & Burnham Machine Co.
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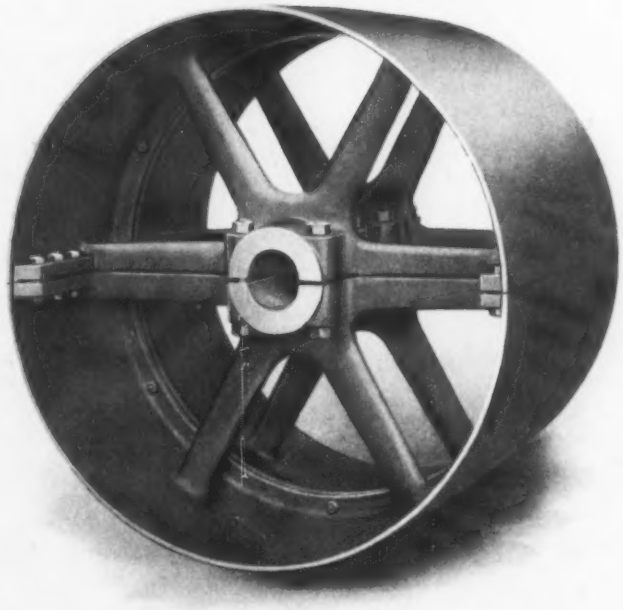

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